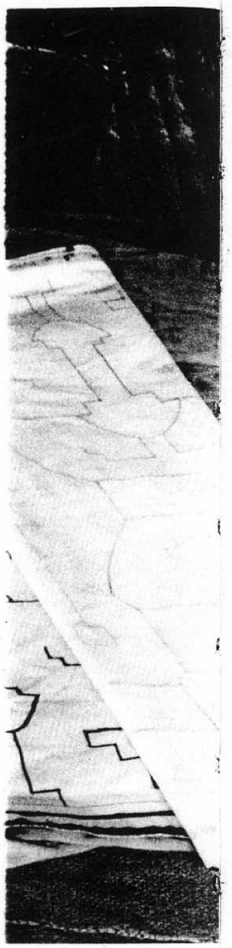

Symmetry Comes of Age

THE ROLE OF PATTERN IN CULTURE

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Contents

Acknowledgments *vii*

Introduction: The Role of Pattern in Culture *ix*
DOROTHY K. WASHBURN and DONALD W. CROWE

1. Introduction to the Plane Symmetries *3*
DONALD W. CROWE

2. Periodic Ornamentation of the Fabric Plane: Lessons from Peruvian Fabrics *18*
BRANKO GRÜNBAUM

3. Creating Symmetry on the Loom *65*
CARRIE BREZINE

4. Symmetries on Mats Woven by Yombe Women from the Lower Congo: On the Interplay between Cultural Values and Mathematical-Technical Possibilities *81*
PAULUS GERDES

5. Continuity and Change in Zulu Beadwork Conventions: The Interaction of Color and Pattern *100*
FRANK JOLLES

6. Motion Pictures: Symmetry as Animator, Classifier, and Syntax in the Nasca Embroideries of Peru 133
MARY FRAME

7. Tanka, Chongo, Kutij: Structure of the World through Cloth *177*
E. M. FRANQUEMONT and C. R. FRANQUEMONT

8. Symmetry Analysis of Ica Valley Ceramics: Insights into Ica-Inca Interactions *215*
DOROTHY K. WASHBURN

6

Motion Pictures

Symmetry as Animator, Classifier, and Syntax in the Nasca Embroideries of Peru

MARY FRAME

Ancient Peruvian art, particularly textile art, is characterized by an insistent repetition of figures in alternating orientations. The different patterns of figure repetition can be distinguished from each other on the basis of the motions of symmetry that generate them (Washburn and Crowe 1988). Symmetry organizes motifs in the space delimited by the borders and fields of garments, much as the syntactic component organizes entities in a language.[1] In the Early Nasca embroideries (0–A.D. 300), symmetry participates in a wider visual system that is language-like in its scope: infinite combinations of figures, symmetries, and other formal components of the system communicate coherent themes and underlying taxonomies. The regular and invariant properties of symmetry provide a door through which it is possible to enter the visual system and to begin to perceive how symmetry is coordinated with other aspects of the visual system. Using symmetry analysis as a "reading" tool, the flat figures in the patterned repetitions come alive with movement, relationships, and actions and even convey a panorama of a structured cosmos.

Nasca Textiles

The Nasca style, perhaps most famous for the desert drawings of gigantic animals called the Nasca Lines, has a richly figurative tradition on pottery and textiles as well. The intimate arts provide a close-up and colorful view of the creatures that inhabit the mythic cosmos depicted by the artists. The polychrome ceramics, which survive better than cloth, indicate that the Nasca style was centered

in the Nasca drainage and the Ica Valley of Peru's South Coast but extended as far north as the Chincha Valley (Menzel 1977:52). To the south, Nasca textiles have been reported from the Majes Valleys near Camaná (Disselhoff 1969). The artistic height of the Nasca style, from which the illustrations are drawn, corresponds with the early phases, c. 0–A.D. 300.

Archaeologically recovered textiles from the Ica and Nasca Valleys exist, but they are not representative of the full range of Nasca textiles. Most excavated collections consist of plainer textiles, probably used by a general population, or small fragments of more elaborate textiles (O'Neale and Kroeber 1930; O'Neale 1934, 1937; Phipps 1989, 1997; Ubbelohde-Doering 1952, 1967; Disselhoff 1969; Silverman 1991, 1993; Orefici 1993). Three mantles recently excavated at Cahuachi (Frame n.d.) confirm the range and vivacity of imagery on more elaborate Nasca textiles. Previously known textiles of this quality, prized for their beauty, color, and fascinating imagery, were not excavated by archaelogists (Levillier 1928; Bird and Bellinger 1954; Paul 1979; Martin 1991; Rowe 1973, 1991; Sawyer 1979, 1997; Frame 1995, 1999b). The largest and best-known corpus of Nasca textiles excavated outside the Nasca and Ica heartland comes from the extraordinary mass interment on the Paracas Peninsula. Julio C. Tello, who excavated more than four hundred mummy bundles in 1927–28 (Tello 1959; Tello and Mejía Xesspe 1979), named the site the Necropolis of Wari Kayan, although it is often referred to as the Paracas Necropolis. One of the styles of embroidered textiles from the Necropolis site, called the "block color" style by several authors,[2] is an elaborate expression of the Nasca style. Many of the Nasca embroideries from the largest bundles, which have the form of garments but dimensions that do not always correspond to human sizes, appear to be funerary offerings rather than clothing for humans.[3] Only a handful of the hundreds of embroideries have indications, such as creases from use or stains from body oil, that they were worn prior to being placed in the funerary bundles.

The Nasca textiles from the Paracas Necropolis site,[4] and similar textiles without provenance (Bird and Bellinger 1954; Lavalle and Lang 1983; Paul 1979, 1990; Kauffmann-Doig 1999), usually repeat a single figure using the technique of stem-stitch embroidery. Surface embroidery is unfettered by technical constraints; thus figures can be repeated in all orientations with equal ease. A vast variety of figures,

some of them identifiable species and others that are mythic composites of several, repeat on different textiles (figure 6.1). The curvilinear Nasca style abounds with depictive detail drawn from the natural world, detail that has been used by scholars to identify the species of some of the animals (Yacovleff 1932a, 1932b; Peters 1991, 1997). Contorted figures, part human/part animal and enmeshed in serpentine streamers that sprout from their bodies, are clearly nonnaturalistic. Many of the depictively rendered animals have nonnaturalistic traits, such as a vestigial arm attached to a shark body (figure 6.2). All figures are part of the same visual system, a system that uses naturalistic detail to varying degrees to communicate about larger themes.

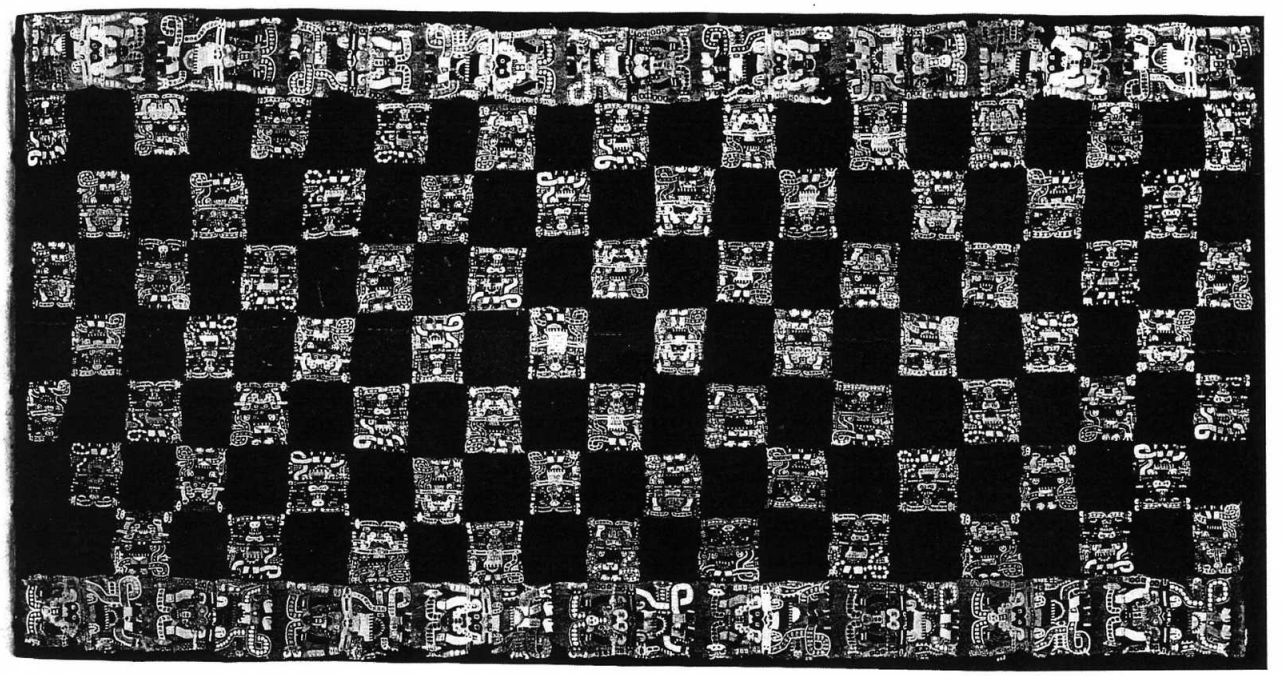


Fig. 6.1. Embroidered mantle, Nasca style, possibly from the site of Paracas Necrópolis, c. A.D. 100–300. Brooklyn Museum of Art 34.1549.

The embroidered beings are propelled by the motions of symmetry through the space defined by borders on garments such as mantles (figure 6.1), small ponchos (figure 6.2), skirts, loincloths, and turbans. Each garment type has a different border configuration and, although most borders do not entirely surround the field (figures 6.1–6.3),[5] there is a visual continuity in the figure repetitions around borders and across the gaps that lends itself to discerning types of motion. Animal figures repeated in the borders have a typical outline—

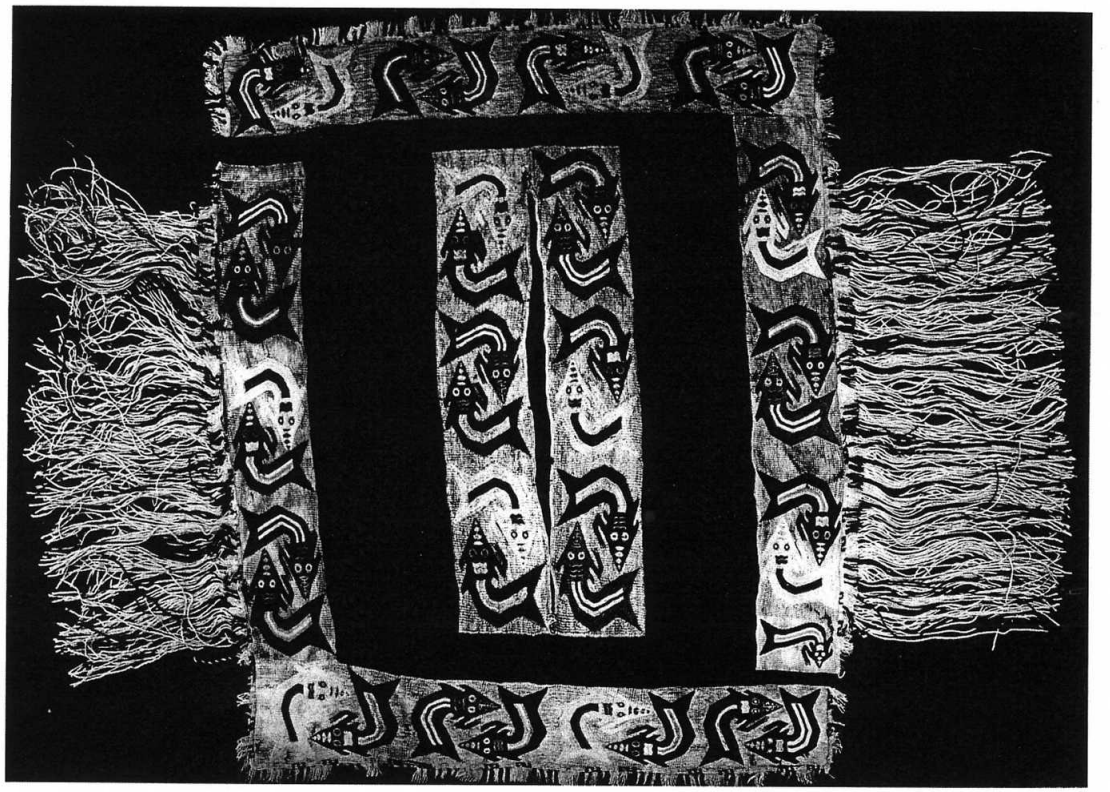


Fig. 6.2. Embroidered poncho, Nasca style, possibly from the site of Paracas Necrópolis, c. A.D. 100–300. Brooklyn Museum of Art 34.1583.

symmetric, asymmetric, or combined—and they are represented as ambulating, flying, swimming, crawling, or swinging through the space of the borders of garments.

To see how the motions of symmetry operate with the animal figures to indicate locomotion, it is necessary to clarify what a typical representation of an animal is. Depictive physical details and anatomical characteristics are important identificatory attributes, but they operate in combination with alignment, orientation, symmetry, and point of view to fully register an animal in what I am calling its "typical guise." A typical guise does not equate with naturalistic depiction.

Isolating the typical guise of animals is complicated by the great number of composite figures in Nasca art and by the manipulation of attributes to communicate thematically. A major theme underlying the composite figures concerns mythic transformation between humans and various animals (Frame 2001). The transformation thesis can be illustrated by assembling figures from different textiles to illus-

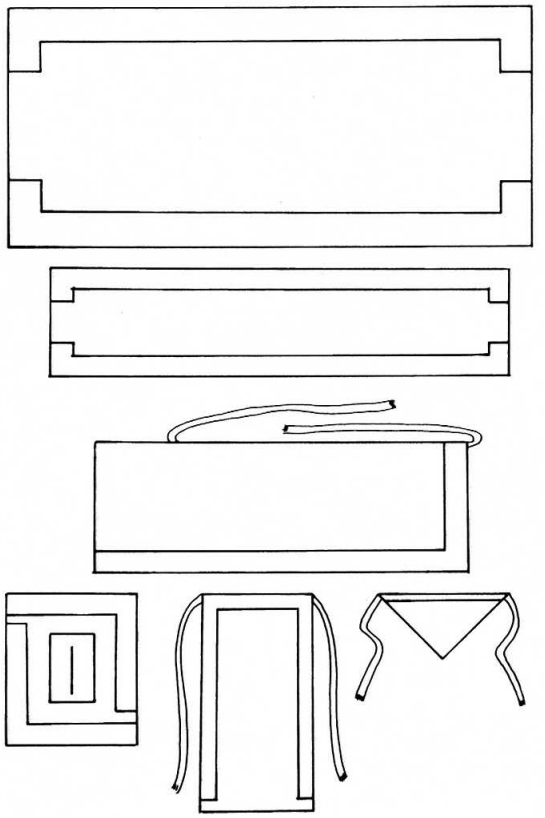


Fig. 6.3. Border forms on typical examples of Nasca garments from the site of Paracas Necrópolis: mantle, turban, skirt, neck poncho, and two forms of loincloths. After Carrión Cachot 1931.

trate staged sequences in which essentially human figures progressively adopt the traits of condors, falcons, felines, or denizens of the deep (Frame 2001:figures. 14–20, 22, 23). The figures from the polar ends of the transformation sequences are almost completely human, at one end, and almost completely animal, at the other end. The relatively pure figures from the polar ends of the transformation sequences will be used to illustrate the typical guise of different animals. Once the typical guise is clarified, it becomes possible to see how the artist manipulates attributes of the typical in order to communicate about the nontypical in the composite figures undergoing transformation.[6]

Walkers of the Mythic World

Typical humans almost invariably repeat, head-to-foot in glide reflection with the backbone aligned with the border length. The figures' knees are usually flexed, the legs are generally shown in profile, and the feet rest on an imaginary ground line. Figures alter-

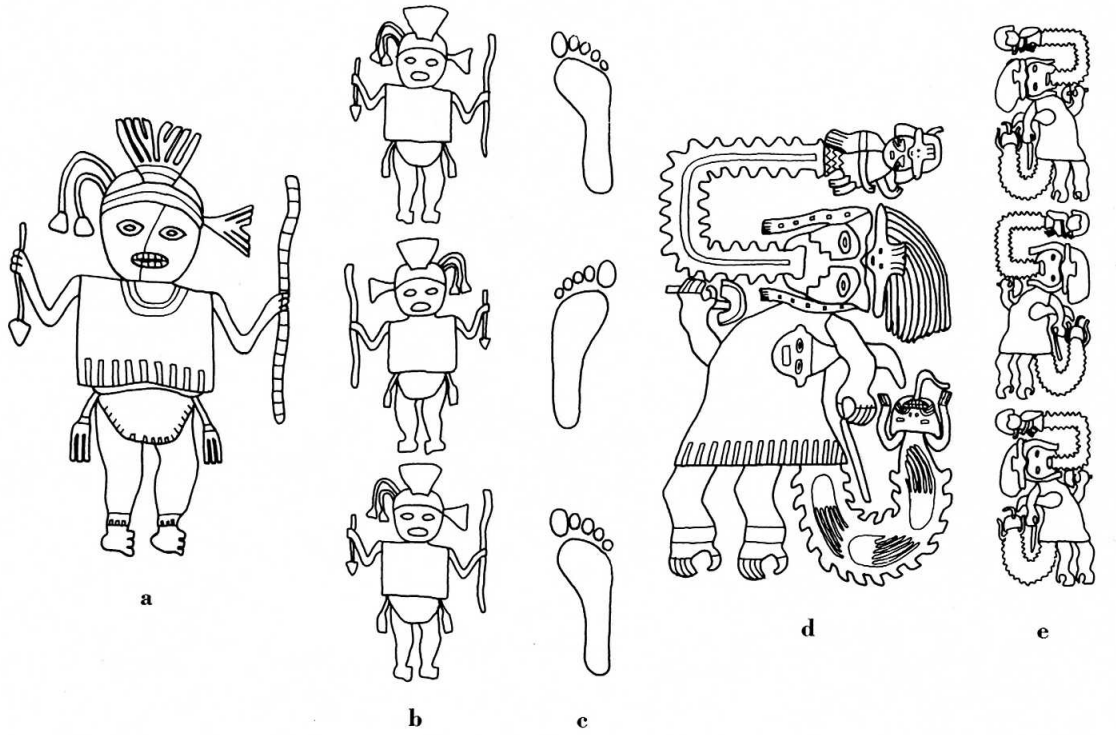
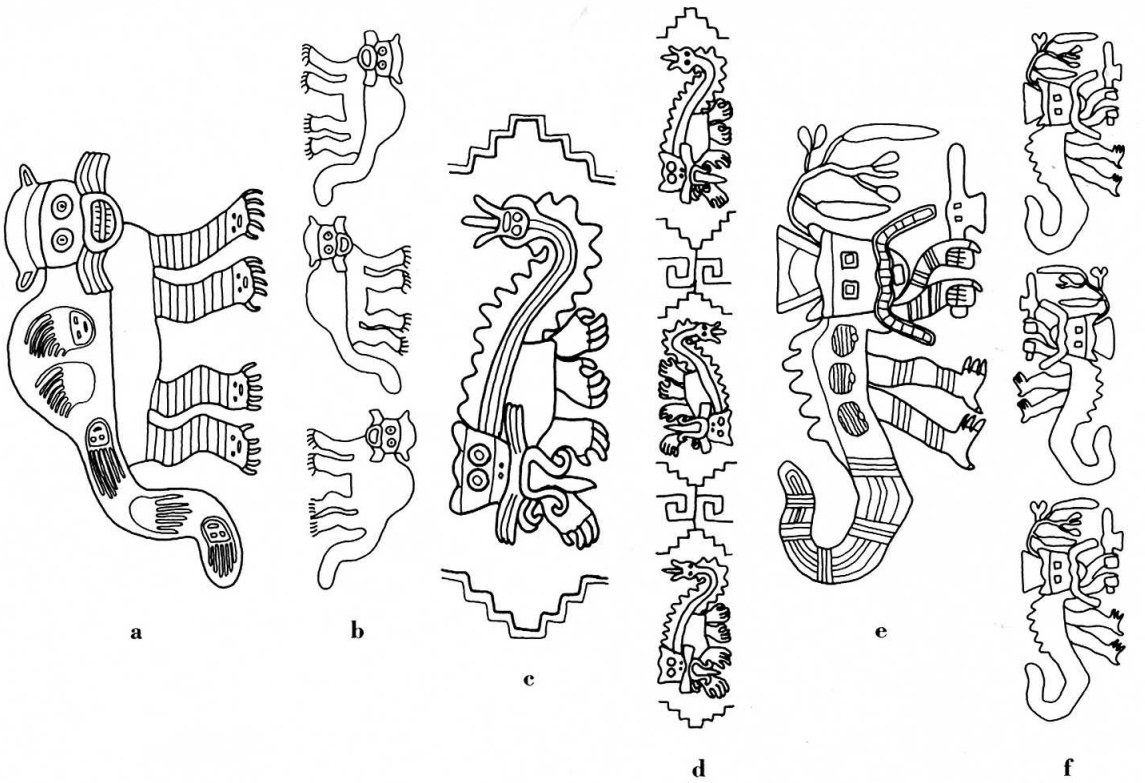


Fig. 6.4. Upright walkers on Nasca textiles repeat in glide reflection symmetry.
a. Human, MMA 1994.35.122.
b. Figure repetition.
c. Footprints have the same symmetry as the walking figures.
d. Transforming human, TM 91.98, after Bird and Bellinger (1954:plate LXXIX, center).
e. Figure repetition, TM 91.98, after Bird and Bellinger (1954: plate LXXVIII).

nately face left and right within the border, like the left-right alternation of footsteps (figures 6.4a–c). Many mythical humans in an early stage of transformation have the foot form of an animal with an opposed digit. The position of the opposed digit clearly shows that figures with profile legs have two right feet when facing to their right, and two left feet when facing to their left (figures 6.4d, e). Each figure is like a single footprint: entirely right-footed or entirely left-footed. The departure from anatomical veracity emphasizes the significance of the left-right alternation that characterizes ambulation. The hands of mythical humans sometimes, but not always, follow the same convention. Human figures, or transforming figures that maintain the erect carriage and bipedal stance of humans, compose the class of figures that is by far the largest.

Four-footed cats repeat head-to-tail in glide reflection with the backbone aligned with the border length (figures 6.5a, b). Like humans, cats also walk on legs in left-right alternation, but they walk on pairs of legs with their backbone parallel to the ground. The cats' legs point to the sides of the border, indicating the carriage difference from the erect humans. The chins of the cats also point to the



side of the border, preserving the typical angle at which feline heads articulate with the backbone. In a curious, but logical, extension of the footedness observed in the human figures, this cat has two right forefeet and two left hind feet when facing to its right. A supernatural cat with a head on its tail (figures 6.5c, d) has the paired left and right feet in reversed positions. Cats in a typical guise are not very common among the embroidered figures,[7] but transforming cats are more numerous (figures 6.5e, f). They are often shown as walking on two feet, a vestige of their antecedent human stage in the transformation sequence, but with the horizontal carriage of a cat.

Birds that walk, stand, or perch usually repeat head-to-tail in glide reflection with the backbone aligned with the border length (figures 6.6a–d). Like cats, their legs point to the sides of the border, in accordance with the angle of leg articulation to the backbone. A variety of bird species repeats in this alignment and symmetry, but with variables in the position of the head and neck that range from forward bent to backward bent. The variables visually suggest bird behaviors ranging from sleeping, feeding, and grooming to mating display, but they may also operate as shifts in meaning within the visual system.

Fig. 6.5. Four-footed walkers.
a. Cats, MMA 1994.35.119.
b. Figure repetition.
c. Supernatural cat, TM 91.417, after Bird and Bellinger (1954: plate LXXIV).
d.Figure repetition, TM 91.417, after Bird and Bellinger (1954:plate XI).
e. Transforming cat, PN 310-31, MNAAHP 03860; see Paul (1990: figure II.27).
f. Figure repetition, PN 310-31, MNAAHP 03860; also see Paul (1990:plate 12) for a skirt with a similar figure repetition.

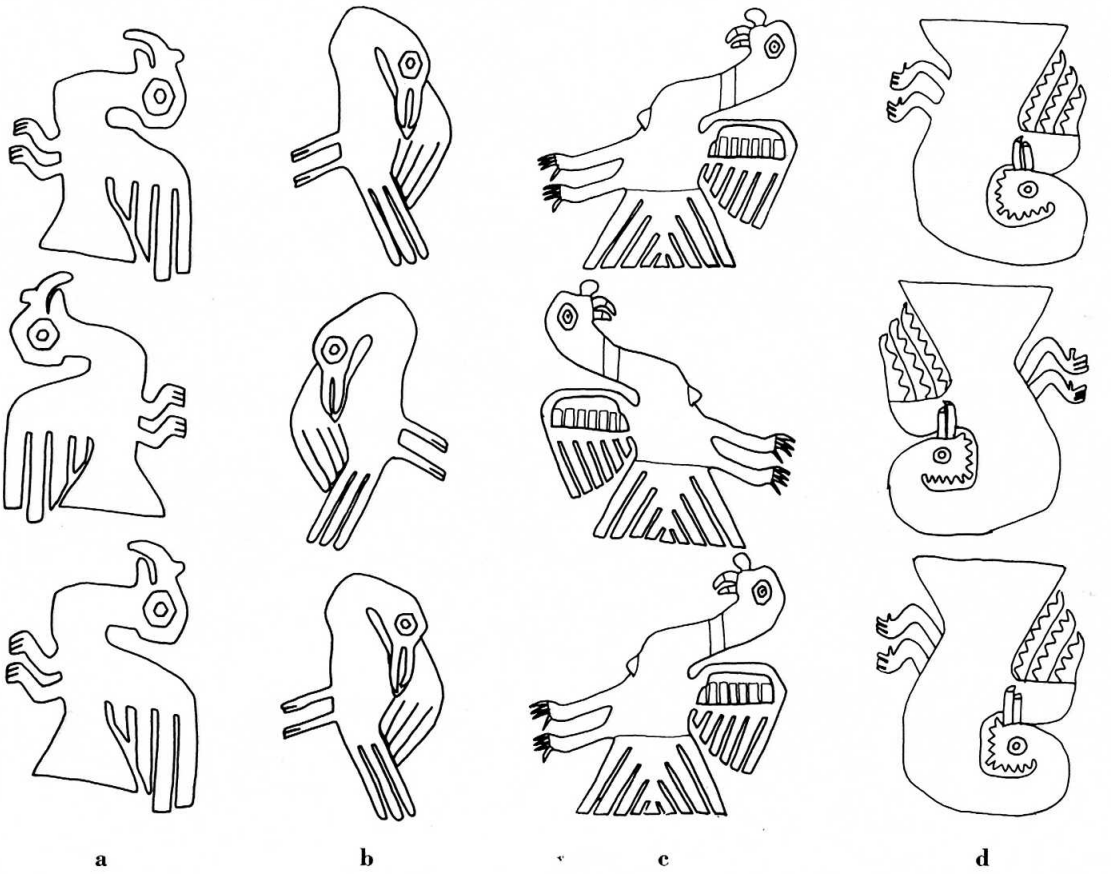


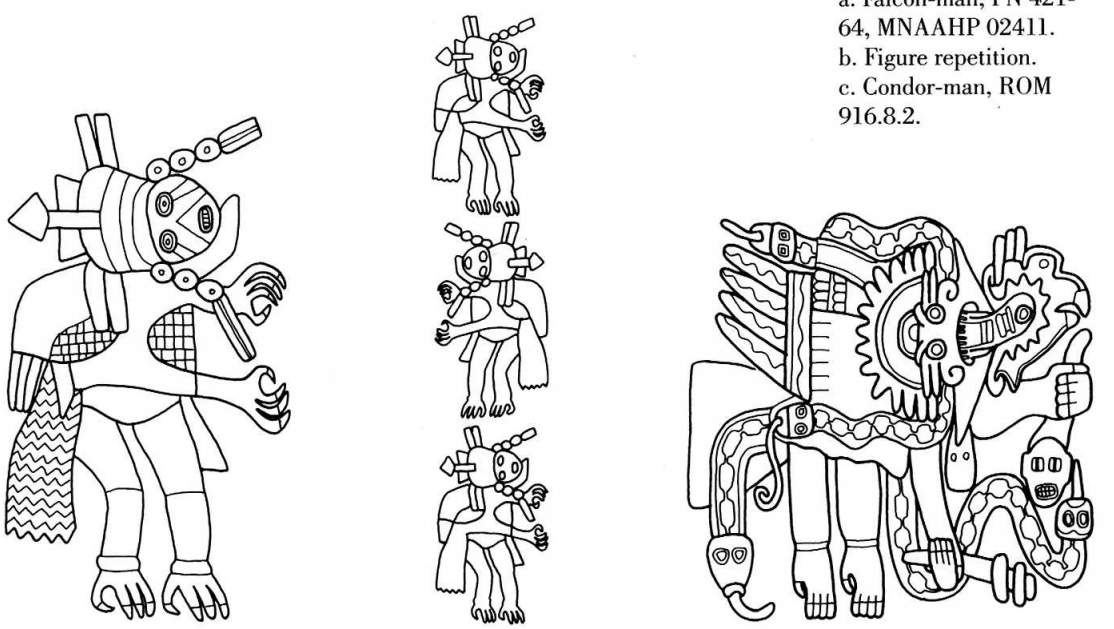
Fig. 6.6. Walking birds.
a. Condors, TM 91.128, after Bird and Bellinger (1954:plate XX, left).
b. Gulls(?), TM 91.127, after Bird and Bellinger (1954: plate XX, right).
c. Condors, PN 262-26, MNAAHP 23843, after Lavalle and Lang (1983: 120).
d. Hawks(?), TM 91.126, after Bird and Bellinger (1954:plate XXVII).

Human figures display a full range of postures from backward bent to forward bent that appears to correspond with a shift from the role as victim/prey to that of sacrificer/predator (Frame 2001:figures 1–3, 5–10, 21–25).

Distinguishing traits among animals in the class of walkers include number of legs, upright or horizontal carriage, and the boney articulation between heads/limbs and the backbone. Specific traits, such as pelage, plumage, clothes, beaks, fangs, claws, talons, whiskers, tails, wings, arms, necks, and ears, are associated appropriately with animal types in typical guises. A preferred point of view is associated with each animal type among the walkers: humans combine a frontal head/torso with profile legs; cats combine a frontal head with profile body/legs/tail; birds are shown in profile. All the walkers have a degree of asymmetry in their outline. Walkers are shown as if seen by an eye located directly across from them, whether they are standing upright or are located closer to the ground.

The walkers of the mythic world repeat in glide reflection, re-creating the left-right alternation of walking with the asymmetry in their outline. The convention of showing figures with either right feet or left feet insists on the "footedness" of figure alternation. The space within the border does not have fixed coordinates: the backbones of the walkers are aligned with the axis of the border pathway, but the imaginary ground line that figures walk on shifts in accordance with their carriage.

The artists manipulate typical features, such as boney articulation, to represent the theme of mythic transformation in composite figures (figures 6.7a–c). A clothed human with folded wing, tail, and falcon breast markings has its arms and taloned hands extended to the side of the border, as if they were bird legs, but remains standing upright on its two human legs (figures 6.7a, b). The upper part of the body conforms to the carriage typical of a bird, while the whole figure maintains the upright carriage of a human. Another clothed figure with arms, shown with folded condor wing, tail and head, is sharply forward bent at the hips as it more completely adopts the skeletal configuration of a condor (figure 6.7c). Transforming figures span the spectrum, from almost purely human to almost purely animal, exhibiting ingeniously combined traits that are refreshingly varied and sometimes humorous.



a b c

Fig. 6.7. Transforming walkers.
a. Falcon-man, PN 421-64, MNAAHP 02411.
b. Figure repetition.
c. Condor-man, ROM 916.8.2.

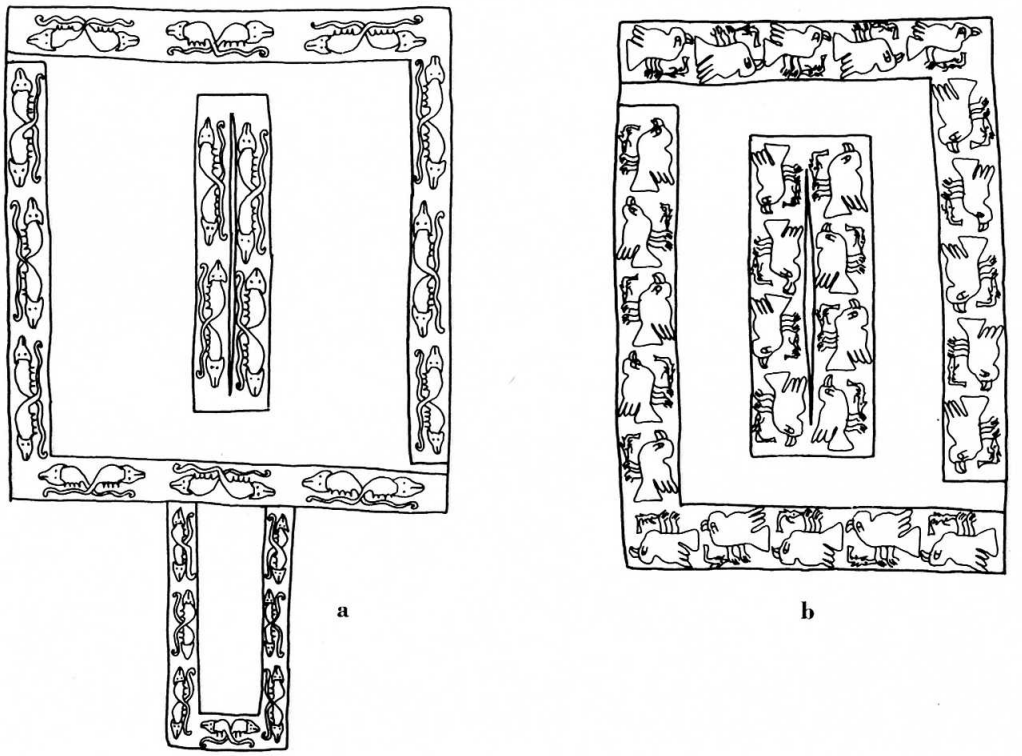


Fig. 6.8. Ponchos showing figure directions in borders.
a. Paired rodents, 382-67, MNAAHP 01446.
b. Falcons 310-32, MNAAHP 03552.

The garment borders are directional pathways for the walking figures who trend in one, or occasionally two, directions. Figures generally move in a clockwise direction on the outer borders, using the head as the indicator of forward motion. A single figure is usually repeated in alternating orientations and color sequences, suggesting a solitary trek around the periphery of the bounded field (figures 6.1, 6.2). Ponchos have an interior border around the neck slit, and the direction of movement is often contrary to the outer border (figures 6.8a, b). A few of the most elaborate Nasca textiles have many different figure types on borders, or on a central band, that change direction at the center points of borders or bands (Sawyer 1997:figures 4, 91; Frame n.d.:figure 6). The multiple figures and the direction changes suggest larger processions trending in opposite directions. The central field of rectangular garments appears to equate with a bounded space, for example a plaza, around which figures or files of figures move in specific directions.

A few pairs of walking figures, informally mirroring each other and sometimes overlapping, repeat in borders: humans, lizards, birds, and rodents (figures 6.9a–e). The individuals in the pair face each other,

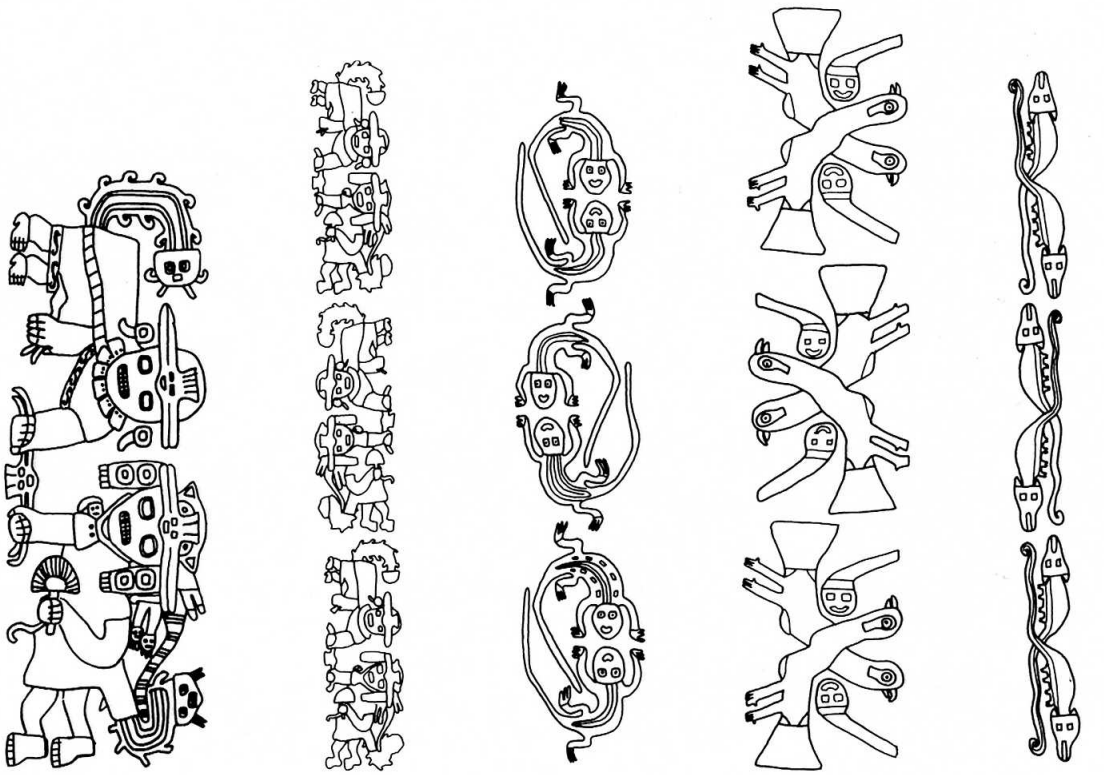


Fig. 6.9. Paired walkers.
a. Man and woman, GEM 35.32.132, after Lapiner (1976:108); see also Paul (1979:plate 38).
b. Figure repetition.
c. Lizards, PN 1-16, MNAAHP.
d. Paired birds, PN 421-125, MNAAHP 02447.
e. Rodents, PN 382-67, MNAAHP 01446, after Lavalle and Lang (1983:64).

and therefore face in contrary directions within the border. The paired unit, and the individuals in the pair repeat in glide reflection, the symmetry that is typical for walkers. Two examples show humans,[8] identifiable as a man and woman by the clothes they wear (figures 6.9a, b). The gendered humans suggest the analogy of a ring dance, as the men and women move around the border in opposite directions, alternating in glide reflection. In intimately connected animal pairs where gender is not explicit (figures 6.9c–e), the opposition in direction might indicate gender opposition in the pair, if clockwise/counterclockwise were culturally gendered directions in activities such as dancing. The rodents with crossed tails (figure 6.9e) are distinguished by whether the tail lies on top or on the bottom. The path of the dominant rodent can be followed in a diagram of the poncho (figure 6.8a): counterclockwise on the outer border and clockwise on the neck slot border and on the tailed extension. The rodent's partner, with its tail on the bottom, can be followed on pathways that

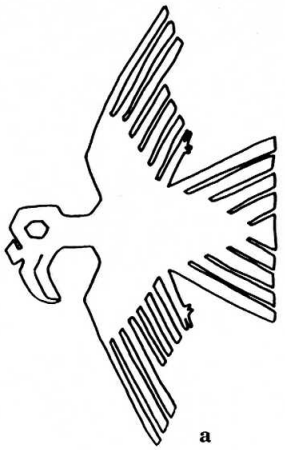
Fig. 6.10. High flyers.
a. Condor, BMA 34.1553; see Stafford (1941:plate VII).
b. Figure repetition.
c. Condor, ROM 931.12.11.
d. Figure repetition.
e. Double-headed falcon, MfVM 33-27-1, after Kauffmann-Doig (1999: plate 45).
f. Figure repetition.

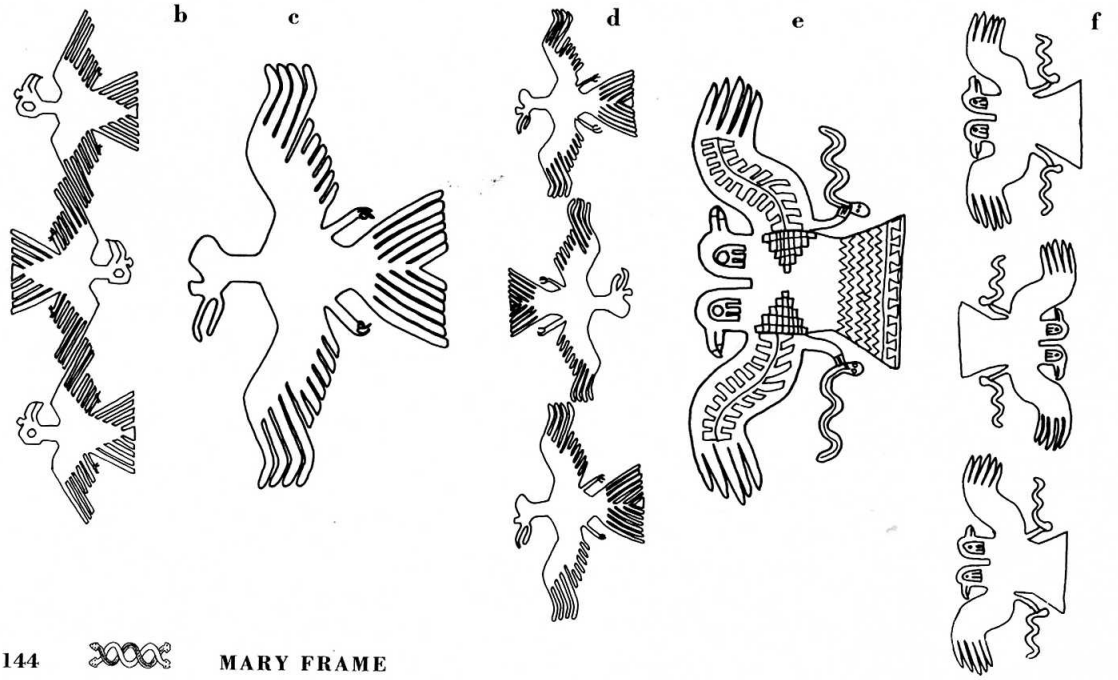
run in the opposite direction. Each rodent in the pair alternates in glide reflection along its circling pathway.

Repetition by glide reflection unites bipedal and tetrapedal walkers in a class within a taxonomy that distinguishes animals by their mode of locomotion. A wide variety of legged creatures that carry their bodies above the ground are included in the class, but only when they are walking. When birds take to the air, they are classified differently. Although the illustrations of animals in their typical guise predominate in the illustrations here, they are not very numerous in the overall sample. More numerous are the composite figures that conjoin attributes of humans and animals and manipulate the typical traits of both to suggest transformation.

High Flyers and Low Flyers

The abstract space of the border shifts when high-flying birds, such as condors, are represented in flight. Condors, and occasionally falcons, are typically shown from a ventral point of view with wings outspread (figures 6.10a–f). The high flyers are seen from below, shifting the border background to a sky backdrop. The backbones of the high-flying birds are aligned transversely in the border, introducing a directional opposition between the sky realm and the earthly realm of the walking figures. Flyers have their bodies and outstretched wings shown in reflection symmetry, although their heads are often in





profile. The reflection symmetry of the wings correlates with the tandem motion of flight. The birds are alternately oriented toward and away from the field of the garment, an alternation that may connote the up-down beat of winged locomotion.

The asymmetry of the profile heads introduces symmetry patterns along the length of the border. The symmetry between high-flying figures is varied and does not suggest a circling of the bounded field as with the walkers. Both glide reflection (figures 6.10b, f) and rotational symmetry (figures 6.10d, f) operate between figures on different textiles, and both clockwise and counterclockwise directions are implied by the direction of heads and beaks on separate garments in a sample consisting of eight textiles. Perhaps the variety of symmetries and implied directions in the borders relates to the freedom of flight, unconfined by pathways, where gyres and riding back and forth on updrafts are equally typical flight patterns. Falcon representations include both single-headed (Paul 1990:figure II.28) and double-headed birds (figure 6.10e). The double-headed high flyers are mirror symmetrical and their repetition is generated by glide reflection or bifold rotational symmetry.

Transforming figures of clothed humans with bird wings symmetrically outspread are usually shown in the human alignment with glide reflection between figures (figures 6.11a, b), as if the figures were still predominantly human and walking in the terrestrial realm. Both the human face and the bird head at the figure's shoulder have the pronged eye marking associated with the falcon. Another example repeats a clothed condor-man with its backbone aligned across the mantle border, in the alignment of a high-flying bird (figures 6.11c, d). The composite figure has the emphatic footedness and glide reflection repetition of a walker, but its body is aligned crosswise in the border like a flyer.[9] The clever manipulation of walker/flyer traits preserves the coherence of the transforming condor-man and creates in the border a delightfully ambiguous background space: sky or earth?

Birds in flight that have human heads, and sometimes arms, are often represented from a dorsal point of view, that is, as if seen from above by the artist's mobile eye (figures 6.12a–d). As they combine human and bird traits, it may be logical that they fly in the part of the sky realm closer to earth. The human-headed birds are most often aligned like humans, with backbone parallel to the border length (figures 6.12a, b). When they have human arms and carry objects

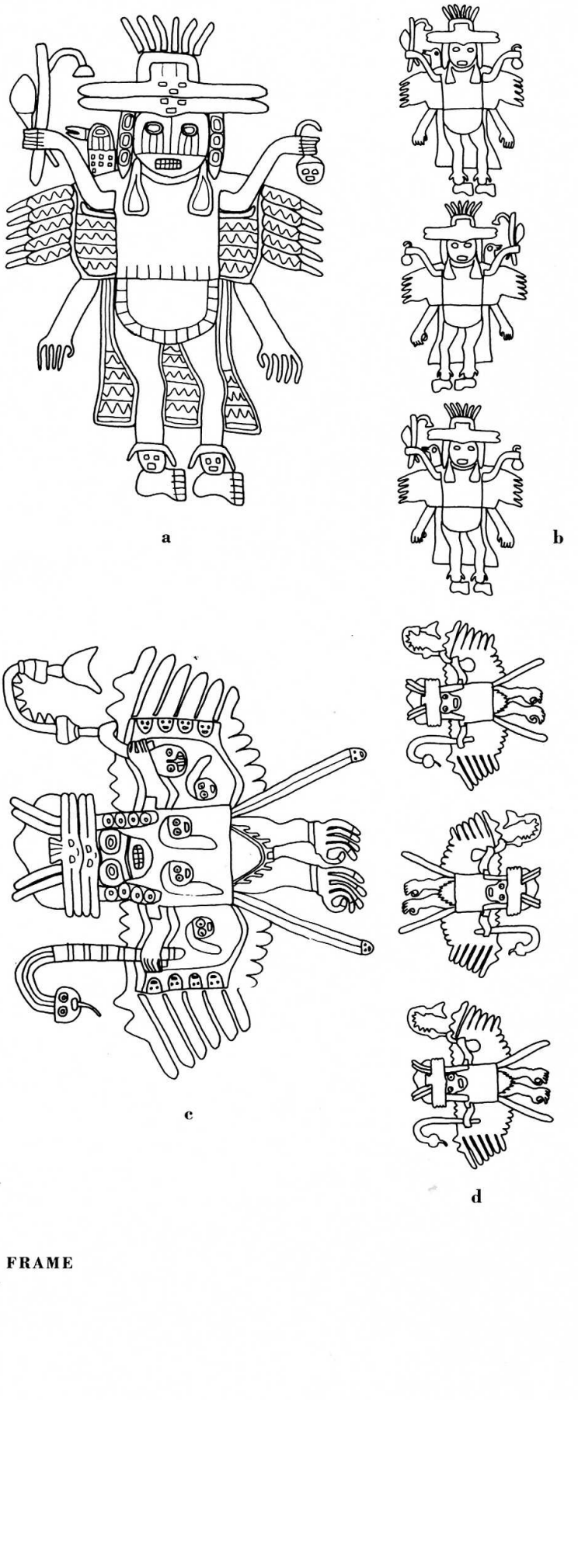
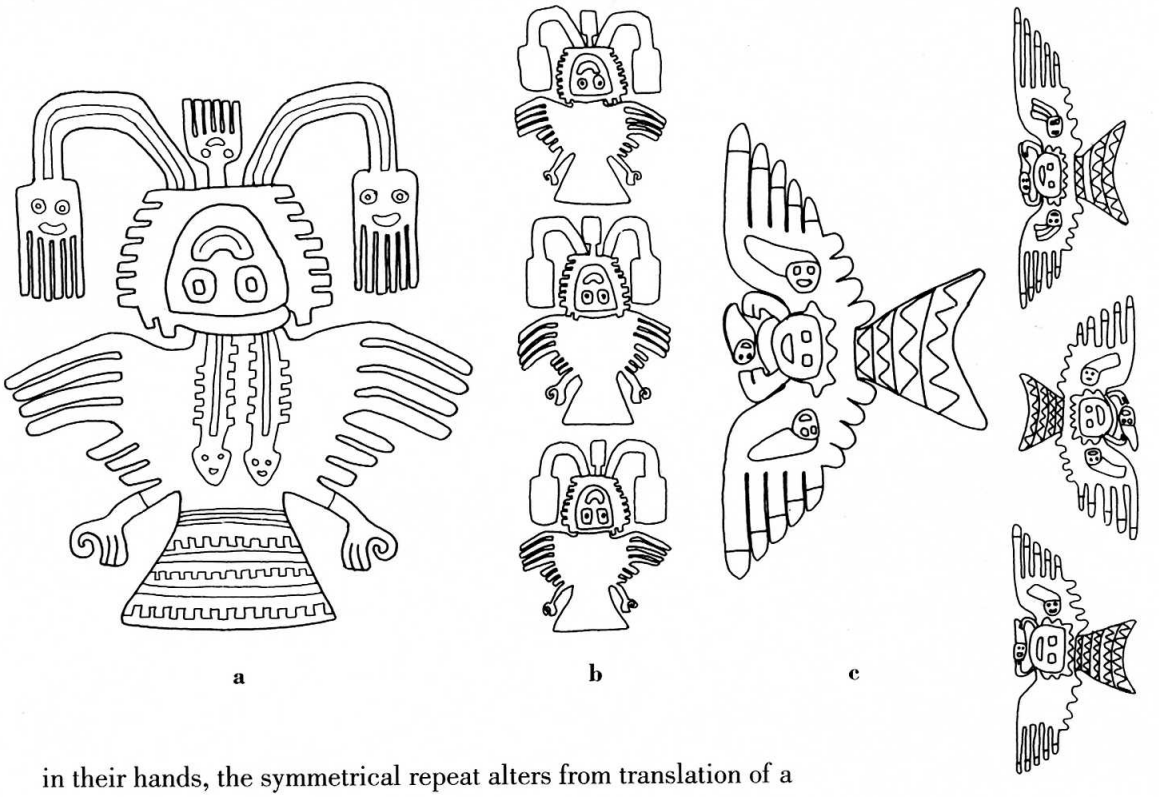


Fig. 6.11. Transforming high flyers.
a. Falcon-man, walking, PN 254-8, MNAAHP 01660.
b. Figure repetition.
c. Condor-man, flying, MFAB 16.34; see Stone-Miller (1992:plates 8a, b).
d. Figure repetition.



in their hands, the symmetrical repeat alters from translation of a reflectively symmetrical figure (figure 6.12b) to glide reflection of an asymmetrical figure. Occasionally, the human-headed flyers retain the crosswise alignment of flying birds in the border (figures 6.12c, d). The artist had at her/his disposal a number of oppositions in the typical traits of animals that could be used to compose an image of transformation that retains its coherence. The four examples in figures 6.11 and 6.12 show different stages in the transformation continuum, from almost human to almost bird. Beyond conjoining physical attributes, the artist also manipulates figure alignment in the border and point of view to express transformation.

Fig. 6.12. Transforming low flyers.
a. Falcon with human head, PN 310-41, MNAAHP 00201, after Lavalle and Lang (1983:90–91).
b. Figure repetition.
c. Condor (?) with human head and arms, DMA 1980.44.
d. Figure repetition.

The occasional flying insect, such as a bee or fly, is shown on painted or embroidered textiles (Bird and Bellinger 1954:plate XCVII) but not in border repetitions that I have seen. Insects are also shown with wings outspread and viewed from above, as if they inhabited the lower part of the sky realm. The representation of flying animals not only suggests the tandem, up-down beat of wings that characterizes this mode of locomotion, but also places them within a structured cosmos. The flying figures convey intimations that the sky realm is opposed to the earthly realm in the crosswise alignment of bodies in

the border and that the sky itself is layered. High flyers, seen from below, and low fliers, seen from above, are propelled through the trackless medium on varied trajectories by different symmetries.

Swimmers

Typical swimmers have curved asymmetric bodies, almost L-shaped, and the requisite fins and pronged tail (figure 6.2). Those with gill lines are shown from multiple viewpoints. Their eyes are shown from above, as if the viewer looks down on them in the watery realm, but the mouth, gills, body, and human arm are shown in profile (figures 6.13a, b). The combination of gills and sharp teeth suggest the swimmers are sharks. The cartilaginous spine, shown in X-ray vision, curves across and along the border length. The dual alignment of the backbone in the border is different from both the crosswise alignment of the flyers and the lengthwise alignment of walkers. The difference appears to signal the watery realm, as opposed to the sky and earthly realms. The asymmetric body outline correlates with alternating locomotion, and the curved body is suggestive of the back-and-forth motion of the tail.

The swimmers are usually paired in rotational symmetry, as if swimming around a point in a clockwise or counterclockwise direction. The direction in which the head points is used to distinguish direction. Although rotation symmetry connects all pairs, it does not endow the connected pairs with a directional movement, clockwise or counterclockwise, around the border (see figure 6.2). The motion of pairs seems to be centered on circling around points, perhaps a conventionalized expression of swimming patterns or other behavior. Several of the textiles have small swimmers around or between pairs, possibly intimating that a gendered pair with its fry is depicted (figures 6.13a–e). The individual swimmer in the pair does have a direction in the border where it repeats in translation symmetry: the outer file is propelled clockwise and the inner file is propelled counterclockwise, or vice-versa (figures 6.2 and 6.13b).

An unusual mantle with swimmers has different patterns in its two long borders. One border repeats swimmers arranged in a single file in rotation symmetry (figures 6.13c, d). The other border repeats the swimmers in glide reflection, propelling them on a counterclockwise pathway (figure 6.13e). As even the most fishlike swimmers are depicted with a human arm, the glide reflection may contain a refer-

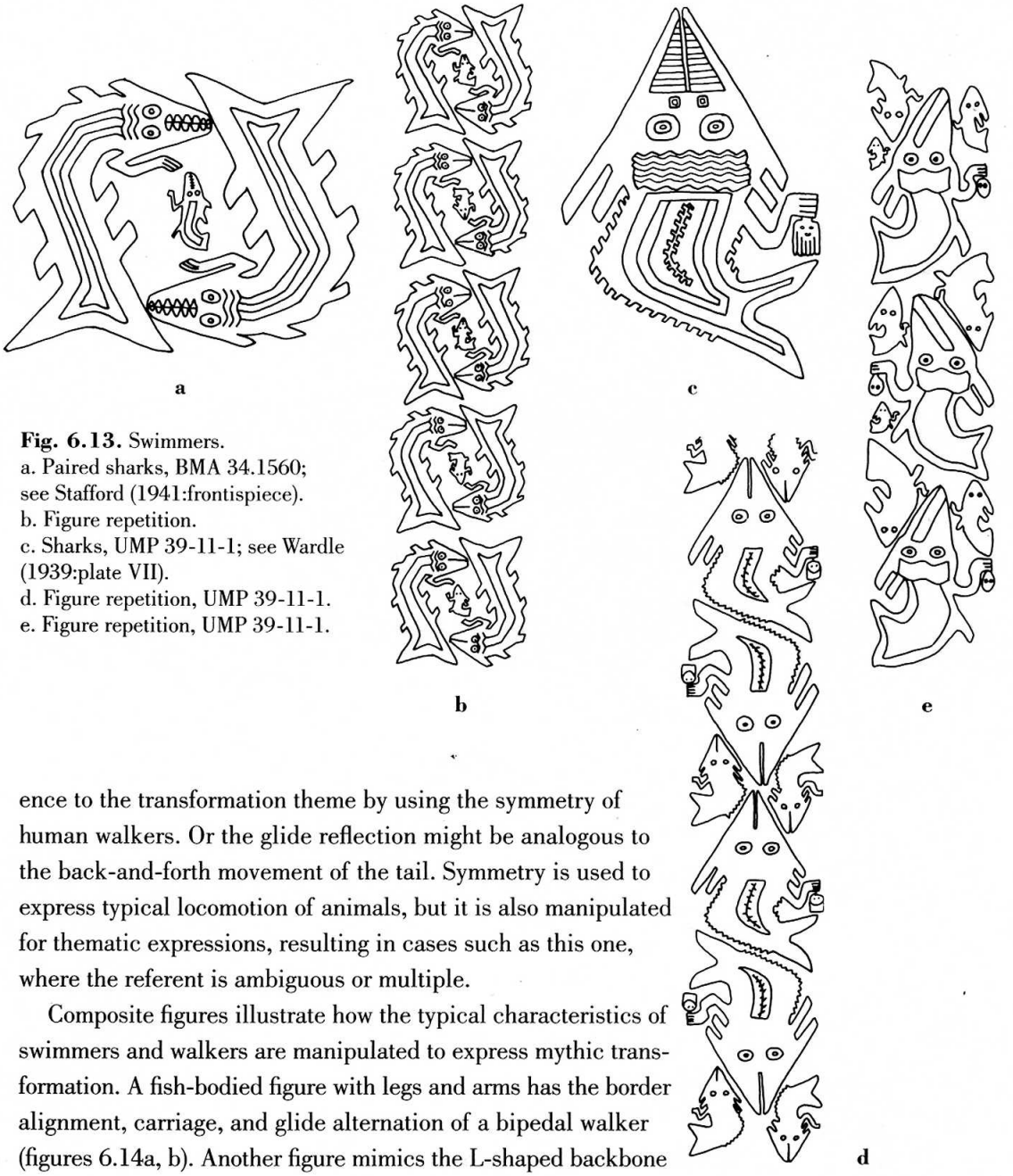


Fig. 6.13. Swimmers.
a. Paired sharks, BMA 34.1560; see Stafford (1941:frontispiece).
b. Figure repetition.
c. Sharks, UMP 39-11-1; see Wardle (1939:plate VII).
d. Figure repetition, UMP 39-11-1.
e. Figure repetition, UMP 39-11-1.

ence to the transformation theme by using the symmetry of human walkers. Or the glide reflection might be analogous to the back-and-forth movement of the tail. Symmetry is used to express typical locomotion of animals, but it is also manipulated for thematic expressions, resulting in cases such as this one, where the referent is ambiguous or multiple.

Composite figures illustrate how the typical characteristics of swimmers and walkers are manipulated to express mythic transformation. A fish-bodied figure with legs and arms has the border alignment, carriage, and glide alternation of a bipedal walker (figures 6.14a, b). Another figure mimics the L-shaped backbone of swimmers in the fish body but stands on two feet (figures 6.14c, d). The horizontality of a swimmer in water is indicated by showing the bipedal feet pointed to the side of the border, instead of in the upright human alignment. The figure is advanced one stage over the previous example in the mythic transformation sequence toward becoming a swimming animal. Two files of figures, side by side in

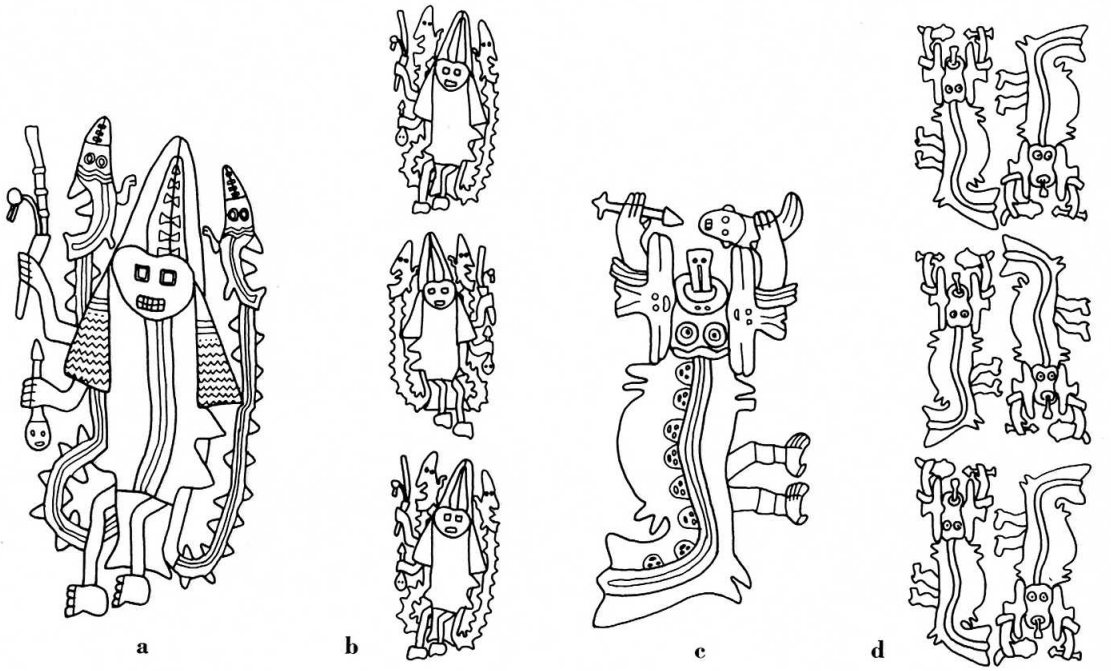


Fig. 6.14. Transforming swimmers.
a. Shark-man, walking PN 38-48, MNAAHP 3129.
b. Figure repetition.
c. Shark-man, swimming (or almost) PN 89-16, MNAAHP 01546; see Kauffman-Doig (1999: plate 44).
d. Figure repetition.

the border of the mantle, alternate in glide symmetry like walkers, with figures moving clockwise in the outer file and counterclockwise in the inner file. Rotation symmetry operates between diagonally adjacent figures. The complex symmetry of this border inventively combines the glide alternation of walkers with the rotation symmetry of swimmers in a unique (to my knowledge) pattern in the embroidered borders.

The inventive artists did not always manipulate symmetry and typical traits to convey the idea of mythic transformation. Several mantles use nothing more than an inversion in viewing orientation of the same figure to accomplish a complete transformation (figures 6.15a, b; Frame 2001:figures 18c, d). Viewed as an upright human, a clothed figure wears an elaborate face mask and headdress composed of shark bodies. Inverted, the negative space in the headdress coalesces as the tooth-filled jaw of an oncoming shark that trails a human body behind.

The killer whale is an important inhabitant of the watery realm in Nasca art, and it is seen on ceramics and in gigantic form on the desert drawings known as the Nasca Lines. I have not located an embroidered border figure that shows the killer whale in its typical

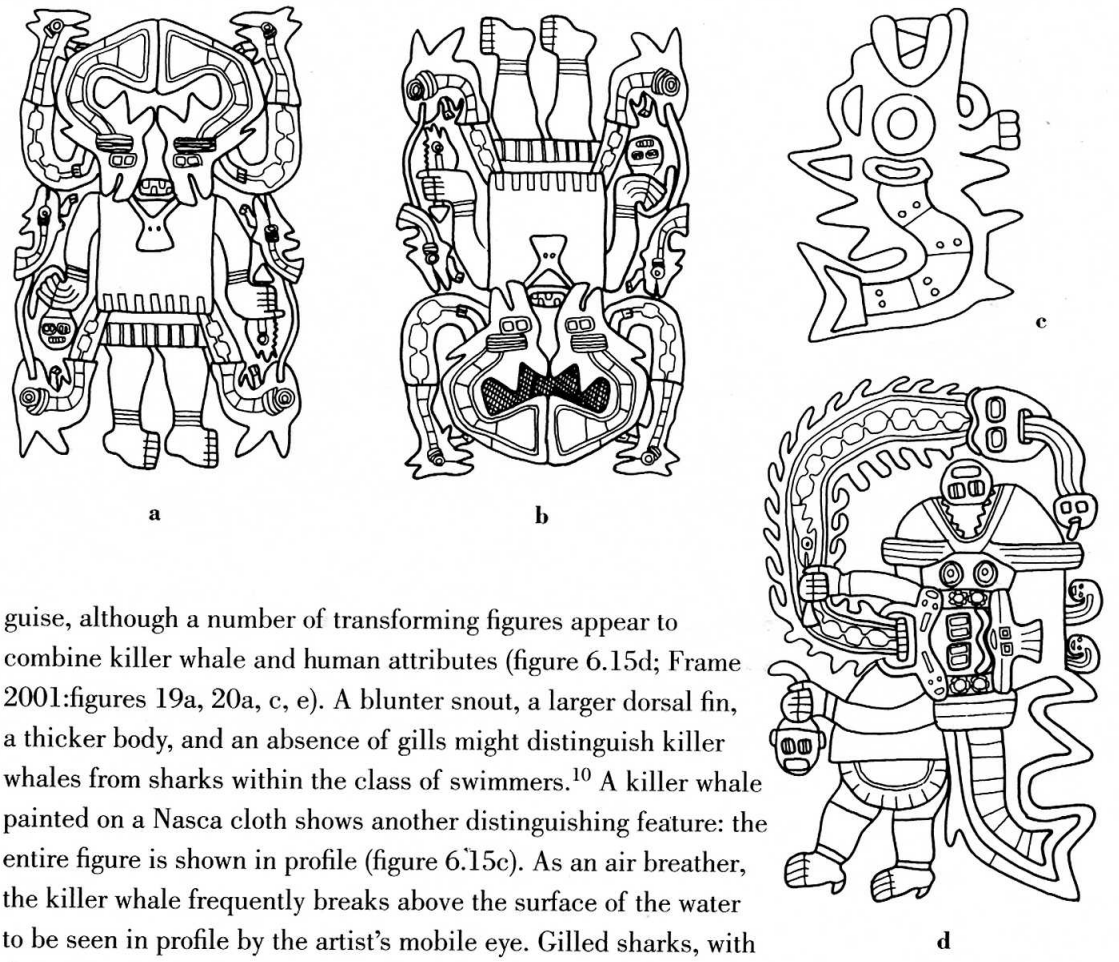


Fig. 6.15. Transforming swimmers.
a. Shark-man, standing, PN 319-9, MNAAHP 01444; see Lavalle and Lang (1983:116–117).
b. Shark-man, diving, PN 319-9, MNAAHP 01444.
c. Killer whale on painted textile, Cahuachi 1998, sector Y16, exp. 67, quadrant 5, specimen 61b.
d. Killer whale-man, walking, MFAB 16.31; see Stone-Miller (1992: plate 12).

guise, although a number of transforming figures appear to combine killer whale and human attributes (figure 6.15d; Frame 2001:figures 19a, 20a, c, e). A blunter snout, a larger dorsal fin, a thicker body, and an absence of gills might distinguish killer whales from sharks within the class of swimmers.[10] A killer whale painted on a Nasca cloth shows another distinguishing feature: the entire figure is shown in profile (figure 6.15c). As an air breather, the killer whale frequently breaks above the surface of the water to be seen in profile by the artist's mobile eye. Gilled sharks, with their paired eyes seen from above, appear to be assigned to the lower depths of the watery realm. The watery realm in Nasca art is perhaps also layered, according to the different points of view used to depict its denizens.

Crawlers

Animals such as snakes, centipedes, lizards, frogs, toads, and crawling insects, whose bellies are on or close to the earth, are shown from a dorsal point of view, unlike animals that carry their bodies above the earth on two or four legs. The switch in point of view intimates that the earthly realm is also a layered domain, with the crawlers inhabiting the lowest level. Typical traits such as body shape, number of legs, tails, and body markings make distinctions between the creatures in the class of crawlers. Frogs, or perhaps toads, are sometimes represented on land (Martin 1991:figure 26) and sometimes

among water plants (Paul 1979:plate 30:17), at the meeting of the earthly and watery realms. Frogs and toads are not among the figures repeated on borders in the current sample, but they occur among multiple figures on other Nasca textiles. Amphibians and reptiles with a low-slung carriage and limbs that jut out are included in the class of crawlers because they are shown from a dorsal viewpoint. However, in repetitions, they ambulate through the motion of glide reflection, like typical bipedal and tetrapedal walkers (figure 6.9c).

Snakes, as crawlers without legs, are represented in a specific manner. Pairs of snakes are shown entwined in flattened helixes (figures 6.16a, b). The linear bodies are twisted together in the manner of a plied yarn, with a specific directionality in the helix that can be described as S-slant or Z-slant. The entwined pair, with heads facing in opposite directions, repeat in glide reflection. The motion of glide reflection changes an S-slant pair to a Z-slant pair (figure 6.16b). One of the pair moves around the border clockwise, the other counterclockwise, in head-to-tail repetition. The sinuous shape of the body contains an alternating side-to-side motion, typical of snake locomotion. Each snake is propelled along its course by glide reflection, the symmetry that is generally associated with alternating modes of locomotion.

Pairs of gendered humans (figures 6.9a, b) also move in opposite directions around the border, which suggests the entwined snakes may depict a gendered pair, possibly even a mating pair. Sometimes the paired snakes are shown as an unequal pair, with the tail of one lying on top of the other snake in both of the last crossings (figures 6.16a, b). In ethnographic studies, the male/female opposition in contemporary Andean societies is often represented as a complementary, but unequal, opposition. Expressions of this concept in the art and architecture of early styles have now been convincingly identified by archaeologists (Burger and Salazar-Burger 1993). The complementarity and the inequality that characterize gender oppositions in the Andes may be expressed in the intimately, but unequally, entwined snakes.

Variations on entwined snakes include a composite figure shown with four limbs near the head (figure 6.16c). The limbs may suggest another type of crawler with a very long tail,[11] or a vestige of the human stage in a transformation process that is almost complete. As

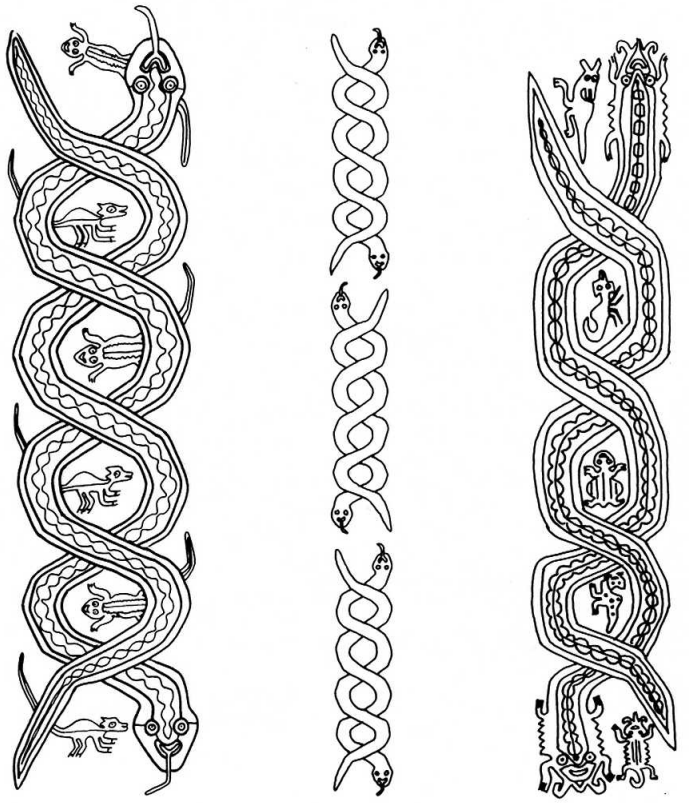


Fig. 6.16. Crawlers.
a. Entwined snakes, TM 91.99; see Bird and Bellinger (1954:plate VIII); also see Stone-Miller (1992:240, #198) for neck poncho with same figure (MFAB 31.699).
b. Figure repetition.
c. Transforming snakes entwined,MMA 33.149.28.

both variants (figures 6.16a–c) have the same body markings and are shown with similar prey and predators, it seems probable the limbed variant refers to the penultimate stage in the transformation toward a snake. The crawling prey (lizard, toad) and walking predators (fox, cat), depicted in the coils of the snake (figure 6.16c), follow the viewpoint convention that distinguishes crawlers from walkers, with crawlers shown from above and walkers shown in profile. The alignment of the small prey and predators is opposite in the typical snake pair (figures 6.16a, b) and in the transforming snake pair (figure 6.16c), perhaps seconding the differentiation between the typical and non-typical. The repetition of the entwined snakes is richly informative, not only indicating its alternating mode of locomotion, its position in a layered cosmos, and its mythic transformation, but also referring to its reproductive and prey/predator relationships.

Simpler crawlers are repeated on borders, many of them shown as double-headed serpentine figures with vestigial arms. Some are twisted

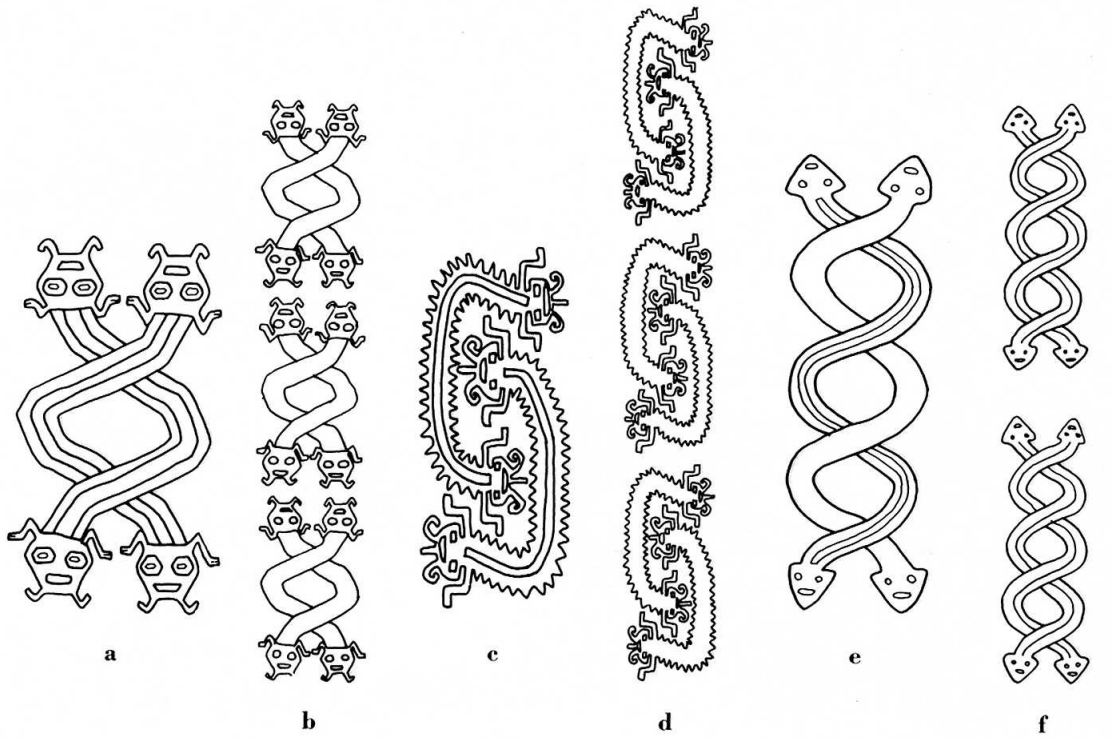


Fig. 6.17. Transforming crawlers.
a. Double-headed snakes with arms, MMA33. 149.15.
b. Figure repetition.
c. Double-headed snakes with arms, MFAB21. 2562, after Stone-Miller (1992:221, #90).
d. Figure repetition.
e. Double-headed snakes, PN 94-57, MNAAHP 02414.
f. Figure repetition.

together in pairs (figures 6.17a, b, e, f), like the entwined snakes just discussed, while others with curved (figures 6.17c, d) and reverse-curve bodies (Peters 1991:7.63, 7.64) repeat without overlapping. As animals in nature do not have heads on both ends of their bodies, the double-headedness is a signal of the nontypical and indicates a purposeful manipulation. On the level of symmetrical repetition, the double-headedness has significant ramifications. Movement around the border in clockwise or counterclockwise directions is nullified, as it is marked by the direction of a single head. Two symmetrical motions, translation and rotation, generate the repetition of double-headed snakes. On a formal level, the figures expand the range of symmetrical repetitions and, therefore, expand the range of expressive possibilities within the visual system. On the level of artistic conventions, multiple serpent heads are used in many styles in the depiction of geometric patterns that are analogous to fabric structures composed of serpentine elements (Frame 1987, 1994, 1999a). Serpent heads are consistently capped on elements to signal that a continuous element is passing behind another element in a flat representation of a fabric or yarn structure. It may be that continuity, expressed in

linkages formed by the extra heads, was a concept of equal interest to the concept of directionality in the borders of Nasca textiles.

The crawlers of the mythic world include more figures than those whose typical carriage places their body in proximity to the earth. The dorsal point of view from which crawlers are depicted is adopted for four-footed animals with prey in their mouths (figures 6.18a-d). The viewpoint from above accords with the low-slung posture of a stalking cat or a cat who lies on its belly to devour its prey. The cats, shown with a bird or a human in their mouths, repeat in glide reflection in the border. The feeding cats retain the left-right alternation of their typical mode of locomotion, but the shift to the dorsal point of view suggests they have lain down to finish the work of a predator.

Humans are also shown from a dorsal (or rear) point of view, frequently when they have mythic prey held to their mouths (figures 6.18a, f). The ambiguity as to whether the human is standing upright with head thrown backward or is lying on its stomach like a feline is masterfully created. The cat headdress and the animal feet of the human figure indicate it is already beginning to transform into a cat, and so suggests that the artist was quite in control of the ambiguity created. Nasca art contains many visual puns deriving from the ambiguity in spatial orientation of figures repeated against a plain border background without fixed coordinates. It is necessary to know what the traits of animals in typical guise are in order to see how themes such as transformation and blood-letting are expressed in the nontypical traits—and to get the jokes.

Swingers

The class of swingers is small and seems to be limited to monkeys. The identification as monkeys is based on the position of the ears, which is different from the position of ears on typical felines and humans. The swingers are consistent in the way in which locomotion is represented, although figures vary in details (figures 6.19a–e). They are represented as semi-erect animals, with backbones aligned with the border length but with legs articulated at an obtuse angle. The angle of the legs indicates that they have neither the upright carriage of humans (figures 6.4a, b), nor the horizontal carriage of cats (figures 6.5a, b). The feet do not rest flatly on an invisible ground line, nor are the knees flexed, both of which indicate that the figure is not standing with its body weight on the legs and feet. The arms are

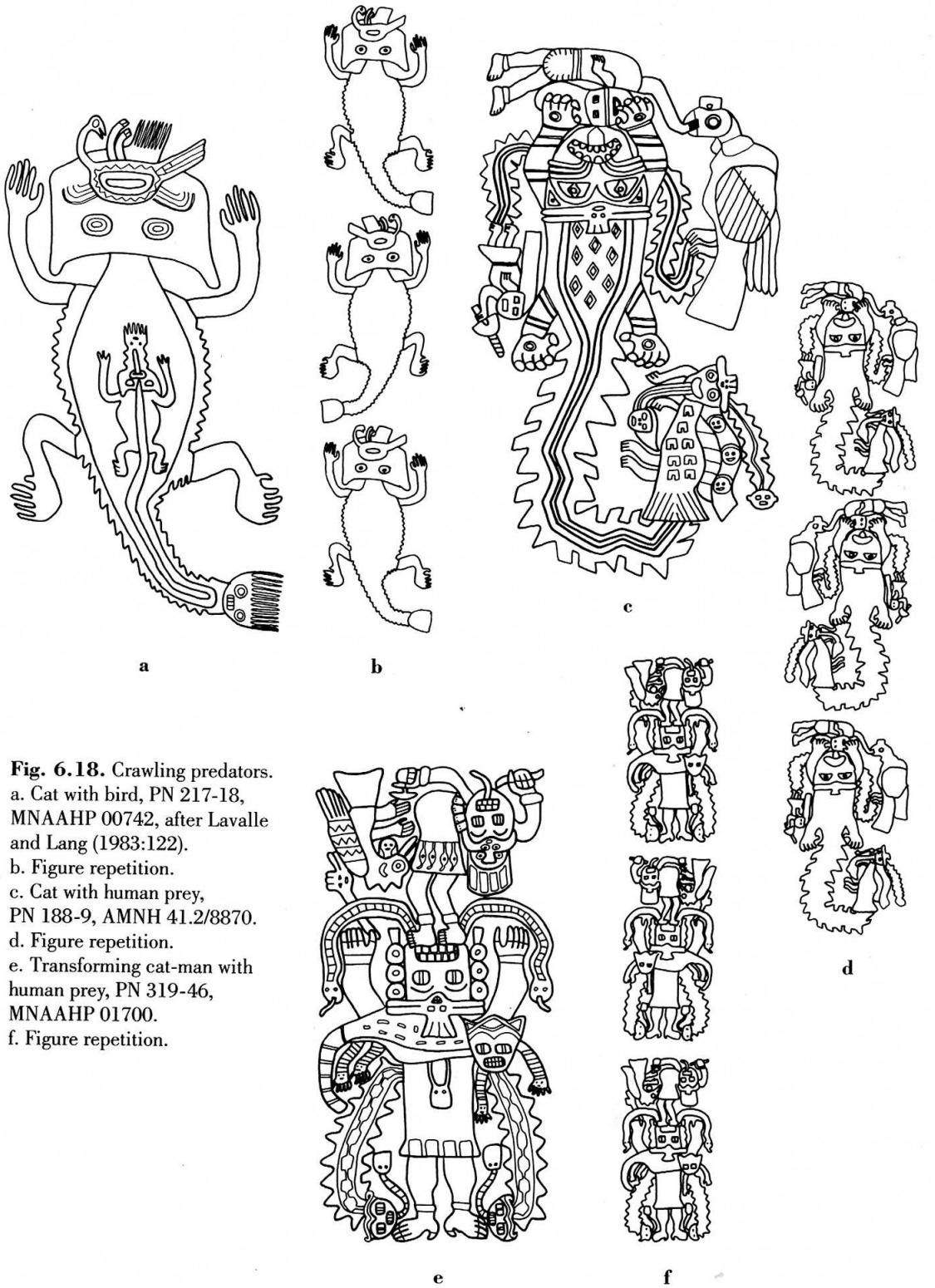


Fig. 6.18. Crawling predators.
a. Cat with bird, PN 217-18, MNAAHP 00742, after Lavalle and Lang (1983:122).
b. Figure repetition.
c. Cat with human prey, PN 188-9, AMNH 41.2/8870.
d. Figure repetition.
e. Transforming cat-man with human prey, PN 319-46, MNAAHP 01700.
f. Figure repetition.

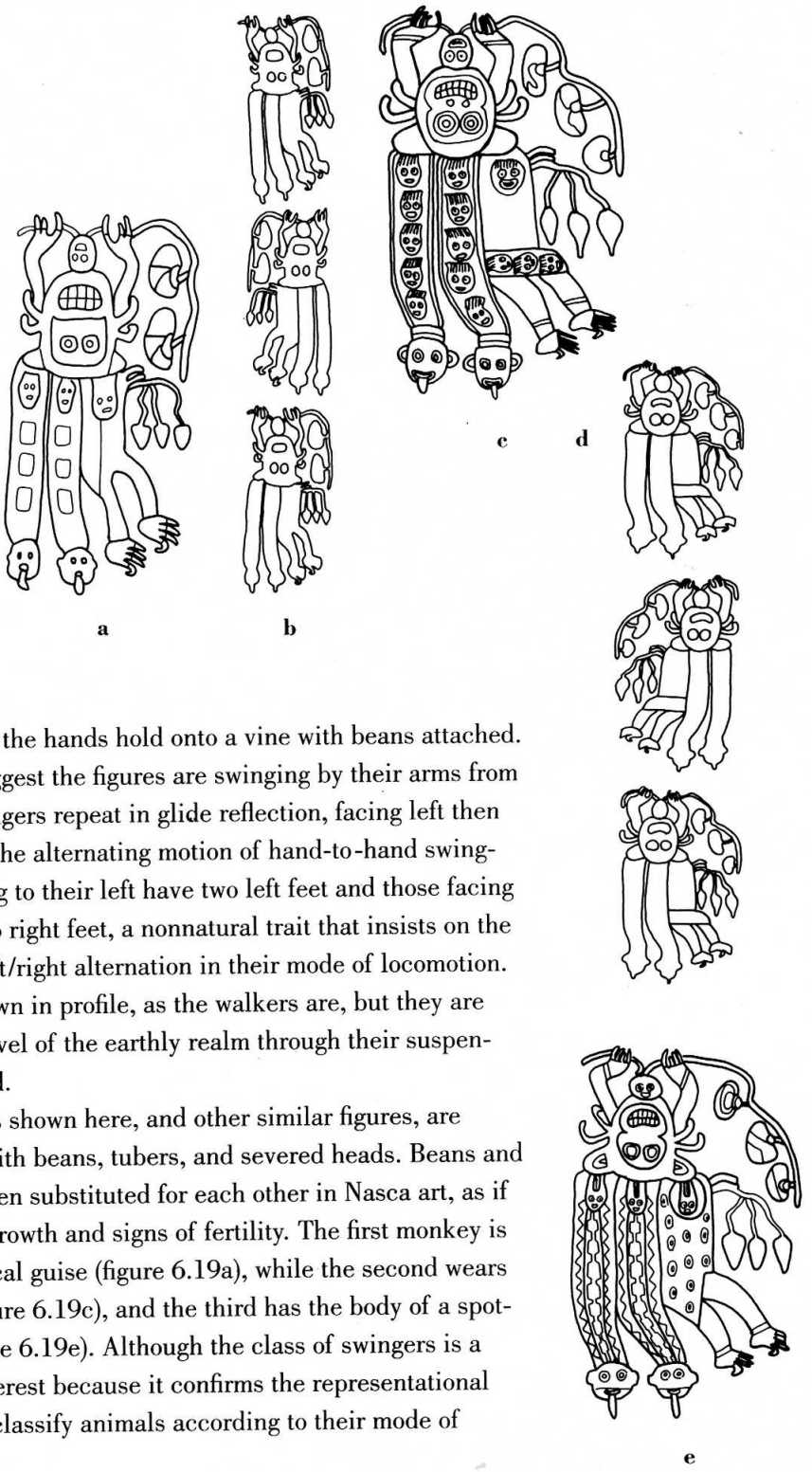


Fig. 6.19. Swingers.
a. Monkey, PN 378-58, MNAAHP 03219; see Dwyer (1979:figure 27).
b. Figure repetition.
c. Monkey in human clothes, PN 38-46, MNAAHP 02699.
d. Figure repetition.
e. Monkey with body of a seed, MAUNSM 4.34 1247T (0915); see Lumbreras (1974:9).

extended upward and the hands hold onto a vine with beans attached. The flexed elbows suggest the figures are swinging by their arms from a bean vine. The swingers repeat in glide reflection, facing left then right, and recreating the alternating motion of hand-to-hand swinging. The figures facing to their left have two left feet and those facing to their right have two right feet, a nonnatural trait that insists on the significance of the left/right alternation in their mode of locomotion. The swingers are shown in profile, as the walkers are, but they are located in a higher level of the earthly realm through their suspension above the ground.

The three swingers shown here, and other similar figures, are strongly associated with beans, tubers, and severed heads. Beans and severed heads are often substituted for each other in Nasca art, as if both were agents of growth and signs of fertility. The first monkey is shown in almost typical guise (figure 6.19a), while the second wears a bordered dress (figure 6.19c), and the third has the body of a spotted seed casing (figure 6.19e). Although the class of swingers is a small one, it is of interest because it confirms the representational conventions used to classify animals according to their mode of locomotion.

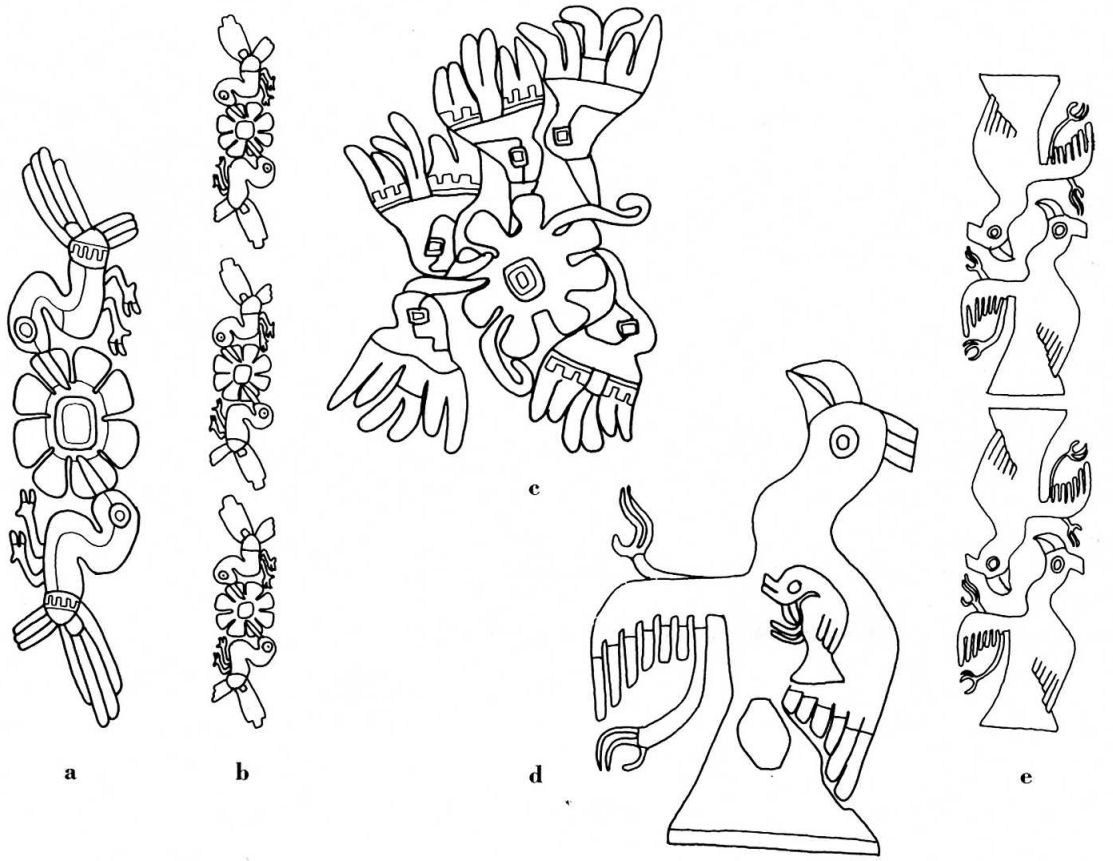


Fig. 6.20. Odd ducks.
6.20a. Paired hummingbirds and flower, PN 262-21, MNAAHP 01448; see Lavalle and Lang (1983:62) for another garment (PN 438-28) with similar figures.
6.20b. Figure repetition.
6.20c. Hummingbirds and flower from cross-knit looped textile, GEM 35.32.179, after Paul (1979:plate 30:31); see also plate 39 (overall).
6.20d. Running curassow, PN 382-29, MNAAHP 01424, after Lavalle and Lang (1983:66–67).
6.20e. Figure repetition.

Odd Ducks

Within each broad class of animals are ones that stand out from the others through their differences. Hummingbirds, for instance, might be thought of as low flyers, except that they have a very different typical orientation when they hover. While feeding at a flower, they appear to stand upright and immobile as their wings whir in a figure-eight motion. Hummingbirds have a separate type of representation in the embroidered borders, revolving around a flower (figures 6.20a, b). They are aligned like walking birds in the border and are shown in profile but with their bills buried in a flower shown from above. The preferred representation in a flat embroidery is two birds in bifold rotational symmetry, spinning counterclockwise around a petaled flower. The unit repetition in a border has both translation and rotation symmetry but not directional motion around the border unless the unit is separated into individual birds. If the hummingbirds are a gendered pair, as suggested for other paired figures, then

males and females trend in opposite directions around the border.

Hummingbirds are also represented in the three-dimensional edgings that surround many Nasca plain cloths (Bird and Bellinger 1954:plates CXI, CXII). The tiny sculptures, worked in cross-knit looping, show birds with their bills in sculptural flowers. In three dimensions, the hummingbird's body is represented as hovering upright, parallel to the stem of the flower. An unusually elaborate Nasca textile in the Göteborg Ethnografiska Museum shows clusters of five or six hummingbirds radially arrayed around a blossom (figure 6.20c). Here they are shown as low flyers, seen from above, like the flower.

The curassow (figures 6.20d, e) is a large bird that spends most of its time on the ground or perched in trees. The embroidered depiction shows it as walking or running, with wings flopping asymmetrically. This unusual bird is repeated in bifold rotational symmetry, which sets it apart from depictions of walking birds that are able flyers. Figures are paired, and individuals circle the border in opposite directions.

Birds receive special attention in Nasca art: many types of birds are represented in several locomotory classes. Large raptorial birds are most commonly depicted, in typical and transforming guises, but small birds and strange birds also have their niches in the inclusive taxonomy.

Spineless Wonders

Nasca textiles include depictions of intertidal or riverine invertebrates such as crustaceans, mollusks, and gastropods (Sawyer 1997:figures 30–36, 38, 133, 136; Frame n.d.:figures 7, 11). These animals occur on a few fancy textiles that have many different figures, so they cannot have their locomotion or pathway charted through symmetrical repetition. Representations of the watery invertebrates in their typical guise are rare, with the exception of crayfish.[12] Most examples are part of composite figures with human and animal traits. Clusters of the water-dwelling invertebrates occur on the several textiles, suggesting they may be grouped in a common category. The exoskeletons are highlighted, a further indication that water-dwelling animals that have their bony structure on the outside are categorically related.

Although there is not enough information on these animals to determine whether they are classified in a parallel way to the walkers, flyers, swimmers, crawlers, and swingers, it is of interest that the water dwellers with exoskeletons are represented, occasionally in typical guise and in transforming figures. The system of classification illustrated in the repeating figures appears to be an open-ended system that can encompass all animals, and possibly even plants. Although plants do not have characteristic modes of locomotion, as animals do, they do have characteristic growth patterns and cycles of seed production that are amenable to taxonomic classification. The plants on Nasca textiles range from flowers (figures 6.20a–c), beans and tubers (figures 6.19a–e), to peanuts and water plants.[13] One distinction among the plants represented on Nasca textiles appears to be whether the edible parts are produced above ground or below ground (Frame 2001). If an indigenous classification of plants is embedded in Nasca art, it likely has categories that are very different from a standard botanical classification.

Picturing Motion

The embroidered animals on the borders of Nasca textiles are distinguished from each other on the basis of their specific attributes and on the basis of their modes of locomotion. Symmetry, in conjunction with point of view, alignment, orientation, and direction, combines with animal traits to convey a natural history classification of the animal world entirely through images. The animals are shown as walking, flying, swimming, crawling, or swinging, and they are also located in their respective realms of the cosmos. Figures are distinguished by the internal symmetry or asymmetry of their representation, in accordance with their alternating or tandem modes of locomotion, and they are propelled through space by the motions of symmetry. While the Nasca taxonomy is not Linnean, there is a clear logic to a classification based on locomotion, carriage, and habitat.

Further distinctions in the classification system are conveyed through an array of directional oppositions that are played out against the ambiguously shifting space of the border background: upright/horizontal, left/right, lengthwise/crosswise, inward/outward, above/below, clockwise/counterclockwise, S-twist/Z-twist. The oppositions are relative oppositions and are given meaning within the context

of a specific animal. A common knowledge of typical animal traits and a recognition of the theme of transformation are the most basic elements needed to begin to differentiate signals carried in the oppositions, and to recognize when they are being expressively manipulated. Symmetrical distinctions are also context dependent.

Symmetry operates within and between figures to convey qualities and directions of motion. Animals in nature are bilaterally symmetric but are asymmetric front to back, a function of their locomotion (Hargittai and Hargittai 1994:16). Animals, as represented in their typical guise in Nasca art, deviate from their symmetry in nature to re-create their locomotion. Those who ambulate, swim, crawl, or swing in an alternation of left-right motions are shown wholly or partly in asymmetric profile. The left-right alternation of those who use two or four limbs is conveyed through repetition in glide reflection, where the whole figure alternately faces left and right. Swimmers and legless crawlers, who wiggle the whole body to propel themselves, are most often repeated in rotational or helical symmetry. Animals who use tandem motion, such as flying birds, are shown wholly or partly as bilaterally symmetric. The up-down alternation of their tandem motion is reflected in the inward/outward alternation in figure orientation relative to the garment field. Taken as a whole, the animal figures exhibit significant elements of both symmetry and asymmetry that refer simultaneously to their form in nature, their typical motions, and the direction in which they move.

Forward direction, indicated by the head, takes the form of several orders of circular motion in the border spaces. The large class of walking figures circles the garment field in clockwise/counterclockwise directions while repeating in glide symmetry. A smaller range of paired figures circle a point in bifold rotation symmetry, clockwise/counterclockwise, but as individuals circle the garment field in opposed clockwise/counterclockwise directions. A few paired figures encircle each other in helical symmetry, distinguished as S- or Z-slant, and the individuals circle the garment field in opposed clockwise/counterclockwise directions. The nontypical double-headed figures, such as serpentine figures, and flying birds with bilateral reflection, broaden the formal set of symmetries and directions represented in the embroideries.

The directional oppositions and the distinctions in symmetry are

part of a broad system that communicates effectively on a number of levels. The artists convey considerable information about the structuring of the cosmos through the mobile eye they cast on figures. Animals of the sky, earth, and water are depicted as moving through or on their respective realms, signaled by the orientation of the backbone relative to the border length. Each of the realms is divided into two or more layers through the point of view from which the artist represents different denizens within the realms. The artist's mobile eye establishes relations of above, below, or directly across from the represented animal, which fixes the figure in a horizontal layer of a given realm. The artist's mobile eye is subtly different from viewpoint, in that it moves vertically. The mobile eye looks downward on low-flying birds, upward at high-flying birds, and directly across at earthly walkers, whether they are upright humans or rodents on short legs. The artist's mobile eye is tutored and reflects back to us a chart of a multitiered cosmos composed of levels and liminal zones within the realms of earth, sky, and water.

The manipulation of the typical traits of animals, in order to express actions or mythical themes that are nontypical, illustrates the range and flexibility of a visual system with directional oppositions and invariant distinctions. The inversion of any one of the paired oppositions adds modalities of expression, while the preservation of the others in their typical format prevents the message from becoming chaotic. The visual system can encompass the expression of new ideas through applying endless inversions to typical or transforming figures. Nasca textiles do not have a set of fixed figure types as some styles do. Instead, major themes,[14] supported by a huge cast of walkers, flyers, swimmers, crawlers, swingers, and transformers, are given novel expression through combinations and manipulations of typical traits.

The visual system that operates in Nasca textiles has more facets than then ones discussed here. Posture and gesture are components that I have explored in a preliminary way in other articles (Frame 2001, n.d.). The extensiveness of variations suggests that further work in this direction can be fruitful. The color sequences that repeat on the same embroidered figures comprise a separate system that is complex and encompassing (Frame 1987, 1991; Paul 1997). The cyclical repetition, or periodicity, of color sequences may correspond

with the periodicity of temporal cycles, meshing concepts of time with spatial movements in figure repetitions. The animal classification may have a numerical component, suggested by the care with which digits with nails or claws and locomotory appendages are represented. Even at this early stage in understanding the visual system in Nasca textiles, it is clear that the system has uncommon breadth, depth, and an economy of expression. Systematic information of various orders is compressed and layered into the figures and repetitions through the syntax of paired oppositions, sequences, and sets of invariant distinctions.

The Nasca textiles from the site of Paracas Necropolis are profoundly important as a compendium of components in the visual system. For some reason as yet not understood, most Nasca textiles from the site repeat single figures in the borders, a practice that more fully registers animals in their typical guise and allows us to perceive the classification of animals presented here. Elaborate Nasca style textiles that were not excavated at the Paracas Necropolis site often repeat multiple figures (Martin 1991; Sawyer 1997; Frame 1999b, n.d.), but the figures are so varied that they appear chaotically disordered at first glance. With the key that resides in the Nasca textiles from the Necropolis site, it is possible to recognize in textiles with multiple figures (figure 6.21) the high flyers, walking cats, swimming crayfish, and transforming low flyers, as well as figures with nontypical traits that follow the standard manipulations. The varied animal and transforming figures are portrayed using the same figural conventions, but they are snipped out of their repetition sequences and pasted up as an assemblage. Nasca textiles with multiple figures appear to be extended texts, made up of the components that are presented in primer fashion on the Nasca textiles from the Paracas Necropolis site. For people who shared with the artist's mobile eye an indigenous way of seeing and knowing the cosmos, the individual figures would retain intelligibility without their repetition sequences, and the multiple figures on the Nasca textiles might read as texts with compounded messages.

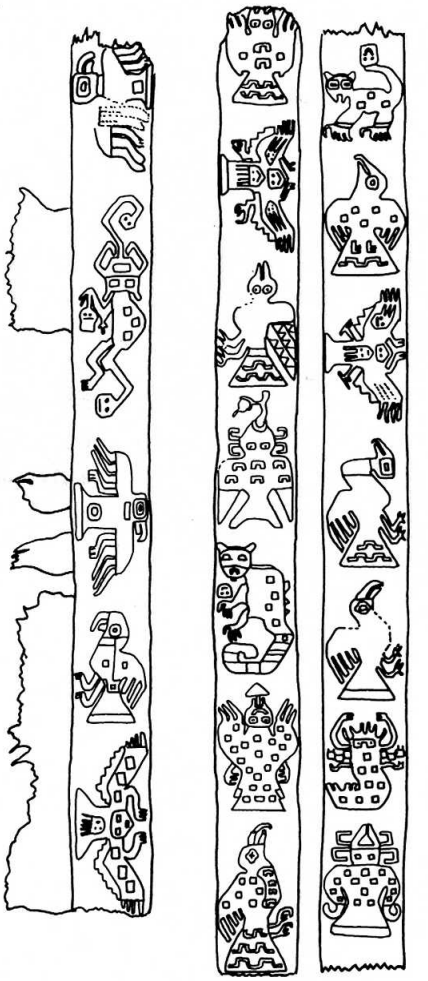


Fig. 6.21. Fragments of Nasca triple-cloth borders with multiple figures woven in the idiom of the embroidered figures, TM 91.248, 91.249, 91.250, after Bird and Bellinger (1954:plate XCVIIIc).

Symmetries, Categories, and Complementary Oppositions

Symmetries, categories, and complementary oppositions run like a leitmotif through ethnographic studies that document the organizational principles of diverse cultural practices in the Andes (Urton 1981; Platt 1986; Franquemont 1986; Allen 1988; Franquemont, Franquemont, and Isbell 1992). Dualism, which organizes pairs of complementary opposites in dyads, is the most pervasive principle. The dyads unite complementary, but unequal, forces in a dynamic relationship: man/woman, day/night, upper/lower, right/left, and so on. Investigations by some archaeologists and art historians have been successful in detecting the principle of dynamic dualism in ancient styles. Reflections of dualism have been discerned in the ceremonial architecture and monuments of early styles (Isbell 1976; Burger and Salazar-Burger 1993) and in textiles (Desrosiers 1992; Bergh 1999; Frame n.d.). Dualism appears to be a durable style of cognitive patterning that is specifically Andean, one that links contemporary practices with expressions in the art and architecture of pre-Columbian styles.

The visual system in Nasca art uses a range of directional oppositions, enumerated previously, to distinguish between categories of animals, their typical modes of locomotion, and their place in the cosmos. The directional oppositions carry important distinctions and are largely organized by a binary or dual principle. Contemporary Andean spinners distinguish yarn twist as right-spun and left-spun, using the word *lloq'e* to signify the unusual, left-spun yarn. Left-spun yarn is used in various magical and curative capacities, in contrast to the ordinary, right-spun yarn used for normal products (Goodell 1968). The word *lloq'e* has a broader meaning, summed up as "something different." The paired categories of "ordinary" versus "something different" are applied to actions and objects in many domains, including, but by no means limited to, yarn spin. The visual system in Nasca textiles uses similarly encompassing categories in portraying animals in a typical guise, then manipulating an aspect of the typical to communicate a nontypical theme. Parallel categories are used in the Nasca visual system to distinguish between animals as walkers, flyers, swimmers, crawlers, and swingers. Categories are organized both in binary opposites and in parallel sets.

Categorization is a common approach to organizing and systematizing information. Andean categories, when grasped, illuminate the abundance of metaphors that permeate cultural expressions. An important study concerning the names of weaving motifs in the village of Chinchero (C. Franquemont 1986) provides insight into Andean classificatory thinking. The names of weaving motifs are names of whole classes of objects and phenomena that share a salient or invariant attribute. A name such as *loraypu* is applied to a diamond-shaped woven motif, but it also applies to a plant with a diamond-shaped leaf, as well as the diamond patterns in basket rims and roof thatching. The zigzagging *k'eswa* motif visually resembles the zigzagging snakes on Nasca textiles, and the name denotes a relationship among things that entwine: vines with branches, ropes with sticks, humans making love. Other woven motifs have names that refer to a relationship between things, a shape, or a quality of line. As Franquemont states (1986), "The same logic of classification extends to design motifs, plants, techniques of basketry, rope-making, or roofing, as well as to social phenomena and activities." The diversity of objects, actions, and phenomena within a named category interconnects various domains and gives rise to metaphors that may surprise us but that have a logical integrity.

The density of references in Nasca art suggests the probability that multiple metaphors operate simultaneously in the repeating patterns. The symmetries in figures and border patterns have analogies in the locomotion of classes of animals, as illustrated here. The symmetries in border patterns also have analogies in the motions of elements in cloth and cord constructions (Frame 1991). Movements by people on pathways through space have regular correlates in the movements of textile elements in cloth that are not unnoticed by Andean people. The most vivid of several examples is a pole dance done by the Callawaya in northern Bolivia (Oblitas Poblete 1978:lamina 53).[15] Men and women, holding ribbons of different colors attached to the top of the pole, circle the pole in opposite directions, weaving in and out as they go. The pathways of the dancers are translated into a braid of ribbons that enwraps the pole. When the ribbons are too short to continue dancing, the dancers reverse direction and unwrap the pole. The movements of the pole dancers are similar to the visual representation of men and women on the embroidered border (figures 6.9a, b), who move in opposite directions while repeating in glide

symmetry. The braided ribbons that enwrap the pole are similar to the wrapping structure I pointed out as a fabric structure analogy for the symmetrical repeat of paired rodents on an embroidery (Frame 1991: figure 4.24; see figure 6.8a, this chapter). Multiple metaphors drawn from diverse domains are different ways of conceptualizing a relationship that shares a salient or invariant characteristic. The pole dance illustrates that symmetrical motion is simultaneously people on pathways and elements of fabric structure pathways. In other contexts, symmetry is grounded in models of landscape or living bodies (Bastien 1978; Cereceda 1986) and reproduced in the actions of the weavers (Franquemont, Franquemont, and Isbell 1992) or in the telling of stories (Allen 1999).

Metaphors are basic to the Andean mode of classifying the world and serve in different situations as tangible models or templates for portraying relationships of a fundamental nature: oppositions, parallels, hierarchies, sequences, and symmetries. Metaphors endow abstract relationships with a physical form based in common experience. The animal imagery in Nasca textiles, drawn from common experience, operates as an extended metaphor that encodes a sweeping vision of a structured cosmos and a classification of all who walk, fly, swim, crawl, or swing within it.

Conclusions

Symmetry, in the Nasca style, is a primary property of the visual system; however, it does not operate in isolation. Graphic expressions become intelligible only when symmetry is registered in combination with figures and with properties such as alignment, orientation, point of view, and direction. A single figure combines aspects of symmetry and asymmetry to convey information about its form in nature and its locomotion. The symmetrical repetition of a figure endows it with motion and direction along pathways. Symmetry operates in a primary way as a classificatory tool; it separates figures into categories, but it does not rank them. Both the symmetry/asymmetry of the figure and the symmetrical motion of the repetition contribute to establishing the discreteness between categories of figures.

Plane pattern analysis, as applied to the description of patterns on material culture objects, was originally derived as the plane version of a geometric tool for the study of the structure of crystals (Washburn and Crowe 1988:3–5). The symmetrical patterns in ancient

Peruvian art, which obviously developed from another source, are more closely allied with pathways in space. The pathways are most often referenced toward figures in motion, as illustrated in this article, or toward the movement of elements in cord and cloth structures (Frame 1987, 1991, 1994, 1999a). A helical pathway, similar to that of a twisted and plied cord or to the intertwining bodies of serpentine figures (figures 6.16, 6.17), is a pathway that is recurrently represented in images and patterns in Andean art. Images of twisted cords, with interlocking Z- or S-shaped units, occur as border patterns in many styles. Separate, or noninterlocking, figures that follow a helical pathway in space are represented in a one-dimensional pattern by combining forward translation with rotation around a longitudinal axis. However, this motion is not included among the plane pattern motion classes (Washburn and Crowe 1988:44). The reason for this, according to Donald Crowe, is that the idea of motion in the crystallographic classifications is a restricted one: it involves only initial and final positions of figures and does not take into account the actual pathway between them. A repetition of asymmetrical figures that is generated by helical rotation around an axis in space produces a pattern that, in the plane, looks like glide reflection. (Editor's note: In the geometry of space, forward translation with rotation around a longitudinal axis has been called "screw displacement.")

The repetition of high-flying birds in figures 6.10b and 6.10f, classified as glide reflection in the plane, likely represents a helical rotation in space. This helical, gyrelike pathway is a logical pathway to associate with condors and falcons within the context of the Nasca graphic system. The birds have different secondary properties from the walkers that repeat in glide reflection: a crosswise alignment in the border, wings, a lack of emphatic "footedness." These properties and visual cues are perhaps sufficient to distinguish a helical pathway of some flyers, which looks like glide reflection, from the glide reflection of the walkers.

As symmetry studies progress, it will be possible to examine in more detail how the property of symmetry operates within a graphic system. Making comparisons to the one-dimensional motion classes is an important tool, both for classification and descriptive purposes and for recognizing when there is an anomaly or a slight misfit. An anomaly or misfit becomes a clue in approaching an understanding of the basis on which an ancient culture developed its systematic

approach to symmetry. The emphasis on helical pathways in images and one-dimensional patterns of several Andean art styles leads me to suggest that pathways in space were an alternative starting point for deriving a similar, but slightly different, set of motion classes. One different motion class for Andean patterns with helical pathways might also be termed glide or axial rotation. The ancient people of the Andes, unconstrained by the proof that there are four rigid motions of the plane (Washburn and Crowe 1988:271–277), developed the expressive potential of a symmetry system that appears to have grown out of, and followed different pathways.

Notes

1. The syntactic component in language has paired deep and surface structures, and syntactic rules interpenetrate with semantic rules (Chomsky 1972:59–61). I am in agreement with Washburn (1999:548), who argues that the syntax of symmetry goes beyond formal properties of pattern structure to embody salient cultural concepts.

2. Publications in recent decades often refer to the Nasca textiles from the Necropolis of Wari Kayan as Paracas Necropolis textiles in the "block color" style, a terminology that began with Jane Dwyer (1979) and has been used extensively by Paul (1979, 1982, 1990, 1991) and others. This terminology gives rise to the erroneous assumption that the "block color" style textiles are a Paracas style, which they are not (Frame 1995, 1999b, 2001, n.d.). The figures are related to those on Nasca ceramics, as some writers (Kajitani 1982) and archaeologists have long recognized (Silverman 1991:404). The mummy bundles often contained textiles in several different styles, referred to as the "linear style" (Dwyer 1979) and the "broad line" style (Paul 1982), which appear to be distinct styles. Although we lack a clear understanding of why textiles in different styles occur, at times, in the same mummy bundle, I have suggested the possibility that the Paracas Peninsula was the site of a regional cult. Tribute textiles, drawn from different South Coast peoples for a joint ritual, could account for the different styles of textiles in the same bundles, as well as for the extraordinary quantity and quality of textiles in the large bundles (Frame 1995, 2001). I have illustrated the common base of Nasca imagery and techniques in the "block color" style textiles from Paracas Necropolis and in three mantles recently excavated at Cahuachi, the major ceremonial site associated with the Nasca culture (Frame n.d.). The depictions of figures, and the garments the figures wear, are closely comparable.

3. Authors who participated in the unwrapping of the large bundles (Carrión Cachot 1931, 1949; Bennett 1938) interpret the garments as funerary or symbolic clothing based on various features: the gigantic size of some garments, the apparent newness of many and the unfinished state of some, the wide range of sizes, and the irregular distribution of garments among the bundles. After assessing the dimensions of garments from personal study of collections and published data, I have suggested that the size range from miniature to gigantic corresponds to an expression of the mythic growth cycle of the interred, from a size as small as a seed to well beyond human stature (Frame 1995, 2001).

4. Illustrations of figures from the Paracas Necropolis bundles are labeled as PN, followed by two numbers that denote the bundle number and specimen number respectively, which were assigned at the time the bundles were unwrapped. The current registration number in museum collections is given as well. Images on more than eight hundred textiles have been considered for this study. The majority of the textiles excavated at the Necropolis of Wari Kayan on the Paracas Peninsula are housed in the Museo Nacional de Arqueología, Antropología, y Historia del Perú in Lima; regional museums in Peruvian cities (Ica, Cuzco, and Arequipa) also have embroidered textiles from excavated bundles. The contents of three large bundles are in the American Museum of Natural History in New York, along with documentation on a fourth bundle opened there and later returned to Peru. Large collections of embroidered textiles without provenance are in the Brooklyn Museum of Art; the Museum of Fine Arts, Boston; the Textile Museum, Washington, D.C.; the Metropolitan Museum of Art, New York; and the American Museum of Natural History, New York. Smaller collections of similar textiles are dispersed in numerous American collections. Published examples in European and Japanese collections have also been considered for this study.

5. The garments and border formats in figure 6.3 are the most common types, but many variations also occur. See Carrión Cachot (1931) and Peters (1997) for a fuller compendium.

6. While the stages in the transformation sequences are clear, the direction of transformation is not. I am assuming that the transformation sequence begins with the human figures and evolves toward the animal figures. This direction would correspond with a narrative line wherein humans evolve toward the animal ancestors in a mythic life cycle after physical death. In Andean folk tales about creation, animals are usually the first ancestors and progenitors of the human race and thus the logical endpoint of the mythic transformation of the human dead into ancestors.

7. GEM 35.32.80 (Paul 1979:plate 26) and TM 1967.15.1 are other examples of cats in their typical guise.

8. TM 91.216 is a border fragment with a similar pair, identified as man and woman by the clothes they wear (Bird and Bellinger 1954:plate LXXII and page 70).

9. A poncho (Frame 1999b:plate 11) and an unfinished skirt (MFAB 16.30, Stone-Miller 1992:plate 9) match the mantle from which figures 6.11c and 6.11d are taken. Figures repeat in glide reflection or rotational symmetry on the three garments; the mantle has glide reflection in the long borders (figure 6.11d) and rotational symmetry on the short borders at the corners (Stone-Miller 1992:plate 8b).

10. Peters (1991:254–260) discusses the representation of sea creatures. The essay usefully collates and extends data from previous identification studies, but attempts to relate traits to specific species on a more detailed level than I sometimes feel is warranted. Some traits in composite figures, such as unusual limbs, likely refer to the transformation theme (see the following note for an example).

11. Peters (1991:286–290) discusses the *teiid* family of earless lizards, which have tiny vestigial limbs, as a possible model for snakelike figures with limbs.

12. The crayfish occurs in its typical guise on several textiles (Paul 1979: plate 30:24; Frame n.d.:figure 7), in atypical guise with four claws (Frame

n.d.:figure 11), and in transforming figures combining human and animal traits (Sawyer 1997:figures 34, 38). Other water animals with exoskeletons can be seen in transforming figures in Sawyer 1997 (figures 30, 33–36, 38, 133, 136). In general, the animals appear to be chitons, bivalves, crayfish, and possibly a tortoise.

13. Identification studies of the plants in Nasca art provide a far fuller list of plants: Yacovleff 1933; Yacovleff and Herrera 1934; O'Neale and Whitaker 1947; Sawyer 1979.

14. Three of the broad, recurrent themes in Nasca art appear to be mythic transformation, bloodletting, and fertility (Frame 2001).

15. Van Kessel recorded dances in square formation from northern Chile that reproduce the structured crossings of colored elements in a sixteen-strand sling braid (1981:294–296). Arnold (1992) relates the act of weaving to the performative arts of singing and dancing through common idioms and dance formations used in Qaqachaka, Bolivia.

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Abbreviations Used

AMNH	American Museum of Natural History, New York
BMA	Brooklyn Museum of Art
DMA	Denver Museum of Art
GEM	Göteborg Etnografiska Museum, Sweden
MFAB	Museum of Fine Arts, Boston
MfVM	Museum für Völkerkunde, Münich
MMA	Metropolitan Museum of Art, New York
MAUNSM	Museo Arqueológico de la Universidad Nacional de San Marcos, Lima
MNAAHP	Museo Nacional de Arqueología, Antropología, y Historia del Perú, Lima

PN	Paracas Necropolis
ROM	Royal Ontario Museum, Toronto
TM	Textile Museum, Washington, D.C.
UMP	University Museum, Philadelphia

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